RightEdge 2010

Program Documentation

by RightEdge Systems, LLC

RightEdge is a trading system development product. Trading systems can be backtested and run in a live environment.

RightEdge Help

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1 Getting Started

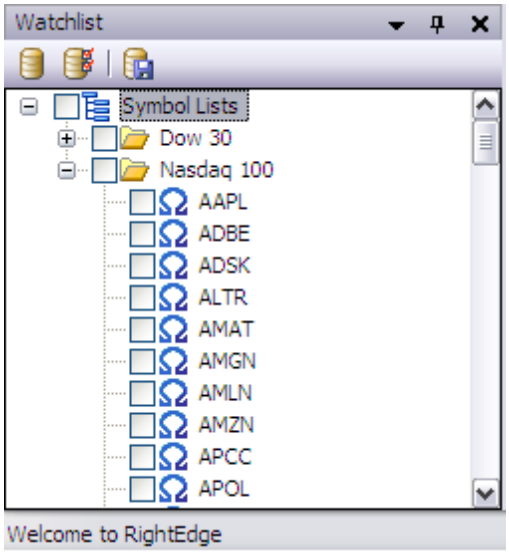
Welcome to **RightEdge**, the next level of trading system development and execution. This article aims to get data and a system developed in as little as fifteen minutes.

This quick start guide is broken into the following sections. Select the topics below to get relevant information quickly.

- Configuring services for the first time.
- Main screen navigation.
- Using charts and indicators.
- Creating a system for the first time.
- Executing a system and analyzing the results.

Configuring Services

A ***service*** is a type of plugin that supports retrieving realtime data, retrieving historical data, or connecting to a broker. Services are associated with symbols in the Watchlist pane.



For a detailed walk through of configuring services, visit the Configuring Services section.

Once services are configured, the next step is to create a symbol list. Right click on the Watchlist window (shown above) to create a folder. Select ***New Folder*** and assign the folder any name. Right click on the newly created folder and click configure folder. This is the area to enter symbols, select the historical data provider, real time data provider and broker.

For details on the Watchlist pane, see the Watchlist section.

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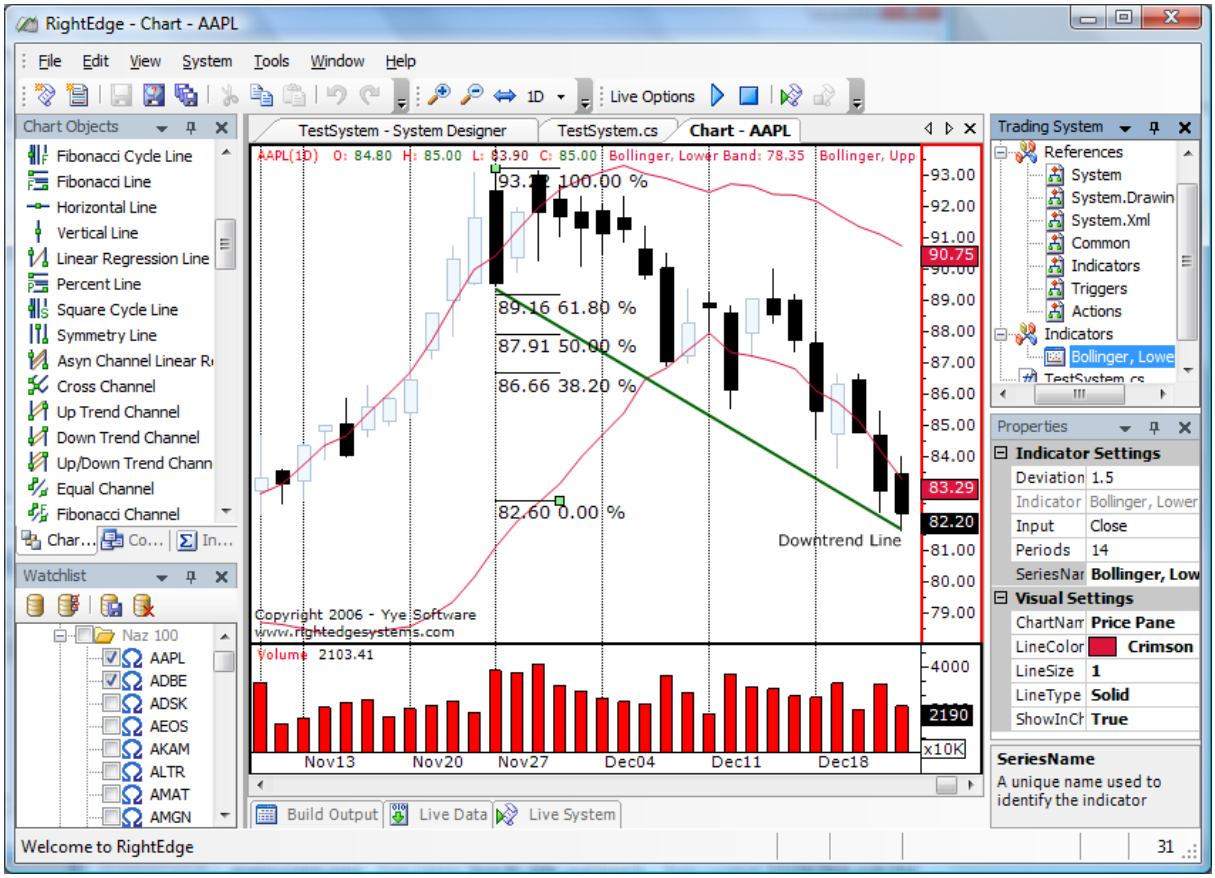
Main Screen Navigation

The main screen in RightEdge is designed to display as much information as possible without getting in the way of doing work. Since you know the best way that you work, the panes within RightEdge are dockable, floatable, detachable and pinnable.



Each sub window contains a label, or a small title bar. This title gives a one or two word description of this tool window's functionality. Each tool window is described briefly below.

- **Indicators**
  This window houses the technical indicators. The indicators are broken off into indicator categories. Indicators can be dragged from the list and dropped onto a chart. A complete list of built in indicators can be viewed here. Indicator properties are displayed in Properties window when a chart object is selected. Indicators can be changed using the Properties window. Changes made to the indicator are reflected immediately on the opened chart. For more information on the indicator pane, see the Indicator Pane help topic.

- **Chart Objects**
  This window contains a list of chart objects that can be dragged and dropped

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onto a chart window. The chart objects are broken off into logical groups. Click and hold the mouse button the desired chart object and move the mouse cursor to the chart window and release to plot the chart object. Chart object properties are displayed in Properties window when a chart object is selected. Chart objects can be changed on the fly. For more information on the chart objects pane, see the Chart Objects Pane help topic.

- **Watchlist**
  This contains a grouping of symbols. Create a folder by right clicking on the top level folder and selecting ***New Folder...*** This will create a folder that can be named and configured. Right click on the newly created folder and select ***Configure Folder...*** to set the symbols and data retrieval settings for this folder. The ***General*** tab contains the frequency of the data and the actual symbols contained within this folder. The ***Services*** tab contains the associated services set with this folder. If a service is configured for real time or historical data, select it in this tab. Different services can be selected for different folders.

  Create folders to group these symbols into a way that makes sense when running various systems. For example, you might want to group the Nasdaq 100 into a folder of its own, but also, there might be a folder for the Biotech or semiconductors, which would be a sub set of the Nasdaq 100. Now these symbols can be listed any number of times in any number of folders all pulling from the same symbol list. For more information on the Watchlist pane, see the Watchlist Pane help topic.

- **Live Data**
  When live data is started, symbol items that are configured and selected for live data will be displayed in this area. Right click on the columns in this window to customize the appearance. For more information on the Live Data pane, see the Live Data Pane help topic.

- **Live System**
  This area contains several tabs that pertain to live systems. This area is updated when a live system is running against live data. Items such as open positions, open orders, P/L, etc are updated while the live system is in progress. For more information on the Live System pane, see the Live System Pane help topic.

- **Components**
  Components are items used to assemble drag and drop trading systems. For more information on the System Components pane, see the System Components Pane help topic.

- **Document Manager**
  This area in the center of the main window contains all of the work related items. Things such as the charts, bar data editor, code editor and trade system results will appear in this work space. Each new work item will create a new tab. As shown above, there is a chart in the foreground with a code window behind the chart. For more information on the document manager, see the Using the RightEdge Environment help topic.

- **Build Output**
  This window contains output related to the system build. If there are syntax errors during the compilation, they will be displayed in this window. If not

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currently working with a system, it would be a good idea to close, or auto-hide this window. For more information on the Build Output pane, see the Build Output Pane help topic.

- **Trading System**
  This window contains the system project. All items associated with this project including source files and references are listed in this tree. Use this tool window to change project settings, perform source file and reference management. For more information on the Trading System pane, see the Trading System Pane help topic.

- **Output Pane**
  The output pane displays information generated by the system. Often times this is user defined output but may also be used by RightEdge when a special condition that is not an exception needs to be reported. For more information on the Output pane, see the Output Pane help topic.

- **Properties**
  The properties window will contain items relevant to the currently selected item. Most of the time properties will be tied to the project files.

Using Charts and Indicators

To display a chart without executing a system, double click any symbol with data in the ***Symbols*** list. The chart window will be opened in the document manager as a new tab. A horizontal scroll bar appears at the bottom of the chart. Use this to navigate through the historical data. There is a toolbar that allows for a quick change to the number of bars displayed per page.

Now that a chart is displayed, use the ***Indicators*** window to begin dragging and dropping indicators onto the chart window. Each indicator has a different interface depending on the input parameters required. Once the ***OK*** button is clicked, the parameters are set and the indicator values are plotted on the chart.

To remove plotted indicators from the chart, move the mouse cursor over any indicator value on the chart and right click. A context menu is displayed and the option named ***Remove Indicator*** is enabled when the mouse is over an indicator. Select this item to remove the indicator values from the chart.

A Word About Chart Persistence

Building a chart to personal taste with the proper indicators and parameters provided to those indicators is a bit of a tedious task. Typically, a technical analyst likes a few indicators on the chart to start. For this, RightEdge offers a way to persist or save charts as they are on the screen. Understandably, it is not important to store the data, but rather the indicators and their parameters.

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Once a chart is built to taste, right click on the chart and select the ***Save Chart Settings...*** item. Give the chart setting a name and click OK. From this point, the chart settings will be available for retrieval on the master symbol list. Reapply the saved setting to any symbol by right clicking on a symbol in the master symbol list and selecting the ***Quick Chart (With Chart Settings)*** item. The saved chart setting will be recalled so that it may be selected. Select the saved name and the chart will appear with the saved settings.

Creating A System for the First Time

System building is the cornerstone feature of the RightEdge platform. Fortunately, starting the system building process is simple and intuitive.

Select ***File*** followed by ***New*** and then ***Trading System***. Select the preferred language (C# or Visual Basic), name the project and click ***OK***. The ***Trading System*** tool window is populated with a new project and a trading system source file.

Note: The language is not of consequence if this is purely a drag and drop trading system.

Once you have created a trading system project, please refer to the Developing Trading Systems in RightEdge topic which provides in depth coverage of creating trading systems using C# and Visual Basic).

Executing a System and Analyzing the Results

A functional system, albeit a simple one, has now been built. This system will take trades if the conditions are met and exit at a profit target of 5% or a time out of 50 bars, which ever comes first.

To execute this system, select the symbol or symbols to run the system against by clicking the checkbox next to each symbol or symbol group. From the ***Build*** menu, select ***Run Backtest***. If all of the steps were followed above, the result of the build in the ***Build Results*** screen should be successful. While the system is executing, a progress dialog is displayed. This will allow cancellation of a simulation run.

Upon completion, a new document is created in the document manager. This document will contain multiple tabs that break the system results down in various detail.

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The ***Summary*** tab contains a quick summary of all trades taken either long or short across all of the symbols selected for this run. It takes the starting capital, computes all trades taken and determines the ending capital. It will display win/loss percentages for long, short and all trades as well as a simulated buy & hold.

The ***Trade List*** tab breaks each individual trade down. Each trade that could've been taken assuming the conditions were met and the capital was available are displayed. The trade list shows the symbol for which the trade was taken, the date of the trade, number of shares, position type and P/L. The far right hand columns keeps a cumulative P/L figure.

The ***Symbol Results*** tab is a very quick and simple way to view the trades taken by each individual symbol. This tab simply aggregates the trade data at the symbol level. For example, if our system traded MSFT four times throughout the course of the simulation, MSFT would be displayed one time with four trades and the corresponding number of winners and losers. It will also calculate total profit and profit per active bar. The winning percentage provides a quick way to determine which symbol or symbols do particularly well and which do not. This may be helpful on days when multiple signals are generated. While past performance does not guarantee future results, it may provide some bias towards symbols that have done particularly well in the past.

For more information on the system results, see the System Results help topic.

See Also

Getting Started With Charts
Analyzing System Results

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2 What's New In This Edition?

This topic will introduce the new features in this edition of RightEdge.

Breaking Changes And Other Important Information

- License files are **NO LONGER COMPATIBLE** between this edition and previous editions of RightEdge. You will need to obtain a new license file for this edition. If you have a subscription in force, are a lease subscriber or have purchased RightEdge in the last 90 days, your customer area will contain an updated license file. Others will need to purchase an upgrade.

- Project files from this edition of RightEdge cannot be opened in previous versions of RightEdge. When you open a project file from an older version of RightEdge, a copy of that project file will be saved with the previous version number added to the filename so that you can still open it up in the older version of RightEdge. For example, if the project filename is MySystem.rep, a copy named MySystem.2008.1.0.0.rep will be saved.

- If you use a custom data storage plugin, you will not have a data storage plugin set up in this edition. You will need to go to the options dialog and choose your plugin there.

- *RList class*
  No longer has AsIList() method or InnerList property.
  Count now refers to the number of available items. This may be less than the total number of bars if MaxLookBack is not zero. The TotalBars property will get the total number of bars.

- RightEdge is now built on version 3.5 of the .NET Framework. This allows trading system developers to take advantage of language enhancements such as extension methods and Linq.

- System results plugins no longer have direct access to bar history. Some of the built-in system results are not calculated (they should display as 0 or n/a).

- The SystemData.TradeInsideBars property has been removed. There is now a CreateTicksFromBars property (which is set to true by default) and an EnableTradeOnClose (which is set to false by default).

- The BarOpened event has been removed.

Multiple Frequencies
RightEdge now has support for multiple frequencies. The Frequency class represents a given frequency for a given symbol. It provides a list of bars for the frequency, as well as events for NewBar and NewTick for that frequency. There are GetFrequency methods on the symbol script and SystemData classes which allow you to retrieve a Frequency object for the desired frequency and symbol. RightEdge will only start building bars for the frequency after you have requested it by calling GetFrequency, so generally you will want to call it in your system startup code. To set an indicator to a different frequency, call SystemData.IndicatorManager.SetFrequency(). If the indicator needs a series as input, and you want to use a bar element series for that input, be sure to use the bar element

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series from the corresponding Frequency class.

The code below shows how to subscribe to bars in a different frequency and how to create an indicator using that frequency.

```
public class SampleSymbolScript : MySymbolScriptBase
{
    Frequency HourlyFreq;
    SMA sma25;
    SMA sma5Hourly;

    public override void Startup()
    {
        //  Create indicator using system frequency
        sma25 = new SMA(25, Close);

        //  Get hourly frequency and subscribe to new bars
        HourlyFreq = GetFrequency(BarFrequency.SixtyMinute);
        HourlyFreq.NewBar += NewHourlyBar;

        //  Create indicator using hourly frequency
        sma5Hourly = new SMA(5, HourlyFreq.Close);
        SystemData.IndicatorManager.SetFrequency(sma5Hourly, HourlyFreq);
    }

    public override void NewBar()
    {
        OutputMessage("New system bar: " + Bars.Current.PriceDateTime.ToString());
    }

    public void NewHourlyBar(object sender, SingleBarEventArgs args)
    {
        OutputMessage("New hourly bar: " + args.Bar.PriceDateTime.ToString());
    }
}
```

Large Data Set Support

Most systems only need a certain amount of bar history for their calculations, and there is no need to keep bar data available past that amount. When working with large amounts of high frequency data, it may not be possible to store all of the data in memory at once. To allow systems to be run with large amounts of data, RightEdge now includes a MaxLookBack property in the RList class. If its value is greater than zero, RightEdge will discard any items past the maximum lookback. If you try to access any of the discarded items, an exception will be thrown. You can set the value in your symbol script startup method, like this:

```
Bars.MaxLookBack = 1000;
```

If you are using multiple frequencies, you will need to set the MaxLookBack on the bar list for each additional frequency, also.

Depending on your system, using a maximum lookback for the bar lists may or may not have a significant effect on your memory consumption. The system statistics, indicators,

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and trade history, as well as possibly your system code itself, may all use a lot of memory. If you need to decrease memory usage, you can selectively disable elements of your system and measure the effect on your system's memory usage. You can use the following code in your system class to help with this:

```
long _initialMemory;

public override void Startup()
{
    _initialMemory = GC.GetTotalMemory(true);
}

public override void Shutdown()
{
    long finalMemory = GC.GetTotalMemory(true);
    long diff = finalMemory - _initialMemory;

    string msg = string.Format("Memory used: {0:n}", diff);

    SystemData.Output.Add(OutputSeverityLevel.Informational,
        msg, null, "", SystemOutputLocation.OutputWindowAndStatusBar);
}
```

There are four sets of system statistics stored (long, short, all, and buy and hold). They save a snapshot is saved for each system bar. If the system is only running with a single symbol, the system statistics memory usage will be significantly larger than the memory used by the symbol's bar data. However, the system statistics memory usage doesn't increase with the number of symbols. So if you are using many symbols the system statistics may not affect your memory usage too much. You can disable some or all of the system statistics by setting the Enabled property on them to false in your system's startup method:

```
SystemData.SystemHistory.LongStatistics.Enabled = false;
SystemData.SystemHistory.ShortStatistics.Enabled = false;
SystemData.SystemHistory.SystemStatistics.Enabled = false;
SystemData.SystemHistory.BuyAndHoldStatistics.Enabled = false;
```

However, with all of them disabled, the system results summary won't show much useful information. Another way to reduce the system statistics memory usage is to reduce the main system frequency. If your system operates on one minute bars, you could set the system frequency to daily, and use the multiple frequency support to run most or all of your system logic on the one minute frequency.

Indicators may also use a significant amount of memory. They don't currently support a MaxLookBack setting, so they will keep all the data for all the bars of your system. If you need to reduce memory consumption you may have to re-implement the calculations outside of a RightEdge indicator. Each trade that your system makes also consumes some memory. If your system trades at a very high frequency then this could lead to high memory usage.

Bar/Tick Generation

The frequency of your system is no longer tied to the frequency of the input data. The main system frequency is specified in the trading system options. This controls the

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frequency for many things such as when your NewBar methods will be called, the default frequency for your indicators, the frequency that system statistics will be saved, etc. Right now you are limited to a set of predefined frequencies or "Tick" for the system frequency. If set to "Tick", then the frequency of the symbols you have selected in the watchlist when you run the system will be used for the system frequency. Otherwise, the input data will be aggregated to the specified frequency and passed to your system.

The input data bars for your system are sent to a tick generator. If the CreateTicksFromBars property in the SystemData class is set to true, the tick generator breaks the bars down into ticks. Currently the tick generator just generates 4 ticks for each bar, for the open, low, high, and close. We will probably allow you to supply your own tick generator, which would allow you to determine whether the low or high tick comes first, or to randomly generate more ticks in between these values.

The ticks from the tick generator are sent to the frequency manager for the system. This aggregates the ticks into the system frequency, and raises the NewTick and NewBar events. The paper broker fills orders based on ticks, which means you can use higher frequency data on a lower frequency system for a more accurate simulation. For example, it is possible that both the profit target and stop loss for a position could be triggered within the range of a daily bar. If you use higher frequency data (say 15 minute bar data), then it is more likely that the simulation will reflect which price would have been hit first.

New Plugin System

This edition of RightEdge introduces a new plugin system. One of the advantages of the new system is that it is easier for plugin writers to define custom settings for plugins. A property grid is used to display the plugin settings, and XML serialization is used to save them. This means that to add a custom setting to your plugin, you simply need to define a public property on your plugin class. The property grid and XML serialization are standard features of .NET, and offer a high degree of flexibility in how the settings are displayed in the property grid or saved to XML. The code below shows how a plugin can define a basic custom property.

```
[DisplayName("Time-based Bar Frequency")]
[Serializable]
public sealed class TimeFrequency : FrequencyPlugin
{
    [Description("Indicates the timespan or period for each bar.")]
    [DisplayName("Bar Length")]
    public TimeSpan BarLength { get; set; }

    public TimeFrequency()
    {
        BarLength = TimeSpan.FromMinutes(1);
    }

    // FrequencyPlugin methods go here
}
```

For more advanced functionality pertaining to property grid customization or XML serialization, please refer to the .NET documentation or other .NET resources.

Currently, only data storage plugins and custom frequency plugins use the new plugin

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system. The new interface for data storage plugins to use is IDataStore. Existing plugins which use the old IBarDataStorage interface will continue to work.

Custom Frequency Plugins

RightEdge uses frequency plugins to handle bar generation. It includes plugins for time based, tick based, and volume based bars. Additional plugins can be created to create other bar types. To create a frequency plugin, derive a class from the abstract FrequencyPlugin class. This class should use public properties to define the settings for the frequency. The actual logic for generating bars should go in a class which implements IFrequencyGenerator and created and returned by the CreateFrequencyGenerator method of the FrequencyPlugin.

To use a custom frequency in a system, create an instance of the frequency plugin class and pass it to the GetFrequency method to get a Frequency object. If GetFrequency is called multiple times for the same settings for the frequency plugin and the same symbol, it will return the same Frequency object. For this to work even if different instances of the frequency plugin with the same values for the settings were used, it needs to be able to compare them to see if they are equivalent. This is why the FrequencyPlugin class includes abstract Equals and GetHashCode methods which you must implement.

Currently, frequency plugins besides the time-based frequency can only be used from within a system. The main system frequency, charts, and bar data storage all only use time based frequencies.

Miscellaneous

Partial bars are now stored in the PartialItem property of the RList<BarData> class. This means that the Current property will always contain a completed bar. There is also a HasPartialItem property which indicates whether there is a partial bar or not.
A bar data cleaner tool has been added. It is accessible from the watchlist, and will find and fix problems with bars in the data store. It will delete extra bars where there is more than one bar for a given date/time, and if the time for a bar is not rounded correctly (based on the bar frequency) it will round it. For daily bars this means it will set the time to 12:00 midnight, for hourly bars it would round to the nearest hour, etc.

There are no longer separate SymbolBars and SystemBars. Use the Synchronize Bars property of the trading system to control whether the bar lists should be synchronized.

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3 Charting Overview

Charts are one of the most important components of any trading system development package. After all, that's where all of the action is displayed in living color. We made it a point to create flexible chart settings and navigation with features that not only make it easier to get from point A to point B, but to do it in style.

A chart can be displayed in any number of ways in RightEdge, but the easiest way is to double click a symbol in the Watchlist pane. If the Watchlist pane is not visible, enable it by selecting ***Watchlist*** from the ***View*** menu.

First some points about data display control. RightEdge charts provide the standard way of zooming in and out using the toolbar buttons (and) to show more bars or less bars. However, in addition to this, RightEdge will also allow a finer control by dragging the mouse over bars to be displayed. This is done simply by starting at the left side of the chart, clicking the left mouse button and dragging to desired bar on the right. Once the mouse button is released, the new selection is zoomed in.

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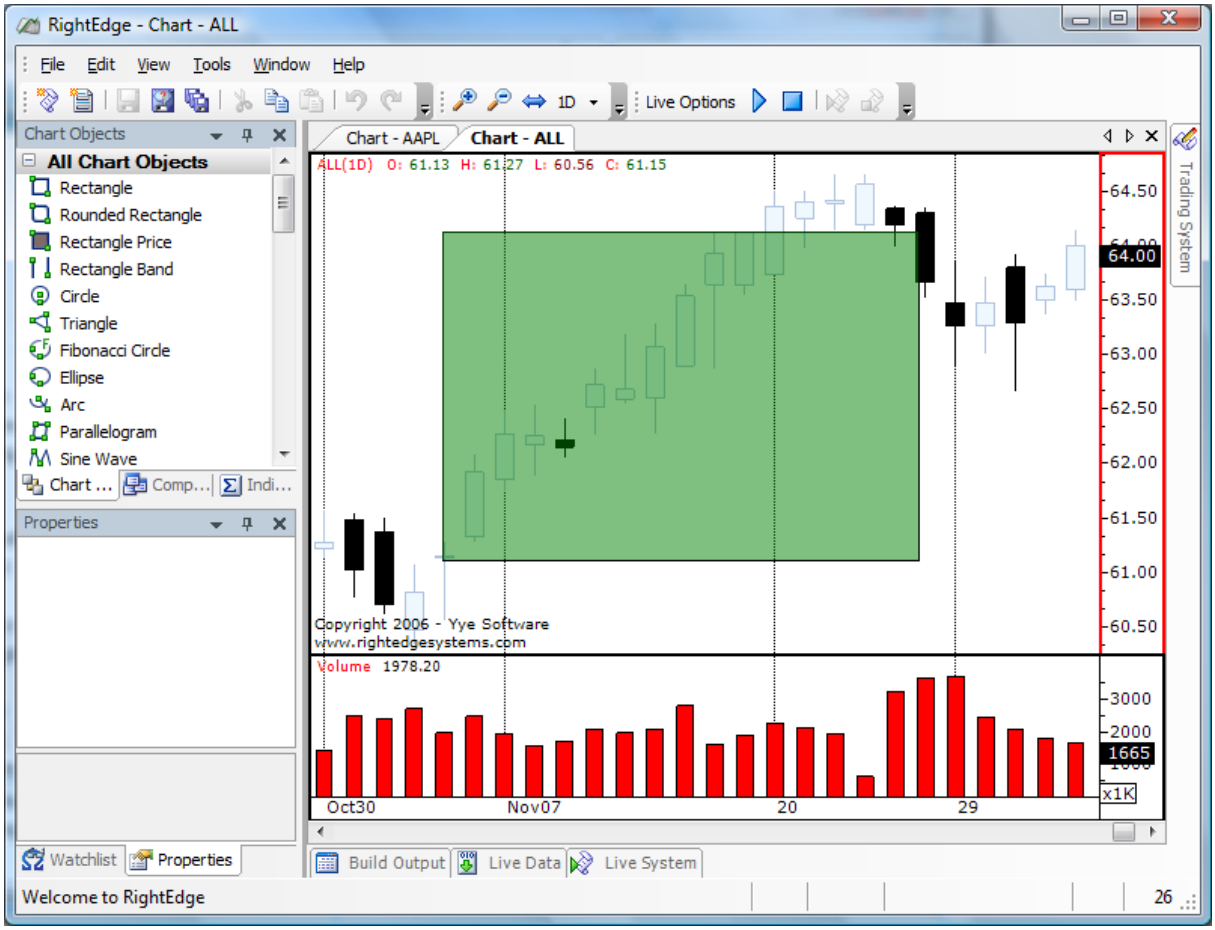

For navigation, RightEdge also provides the familiar controls, but in addition to using the scrollbar, RightEdge makes use of the mouse wheel. Move the mouse wheel down to go back in time and up to move forward in time.

Finally, the chart package in RightEdge provides a combination of scrolling and navigating within the X and Y axis. Both axes are broken up until thirds. If you place the mouse cursor on left third of the X axis (date/time axis), the cursor becomes a "sizing" cursor. Click and hold the left mouse button while moving the mouse left or right and more or less bars will become visible in the left side of the chart. Release the mouse button when the desired number of bars come into view. Now move the mouse cursor to the middle third of the X axis and the cursor becomes hand with an extended index finger. Click and hold the left mouse button and this will move the chart from left to right based on the mouse movement. Finally, move the mouse cursor to the right third of the X axis and click and hold the left mouse button. This will allow finer control of the bars displayed on the right hand side of the chart. This logic holds true for the Y axis as well.

Changing Frequencies

RightEdge supports a number of frequencies. The most common frequencies are shown on the chart toolbar alongside the zoom features discussed previously. The default is daily, abbreviated as "1D". Click the "1D" text to display the frequency drop down. Depending on the data that is currently loaded, the available frequencies are enabled. For example, if the lowest frequency of the data is daily bars, anything less than one day is unavailable. Select ***Weekly*** from the dropdown to automatically rebuild this chart with the same data

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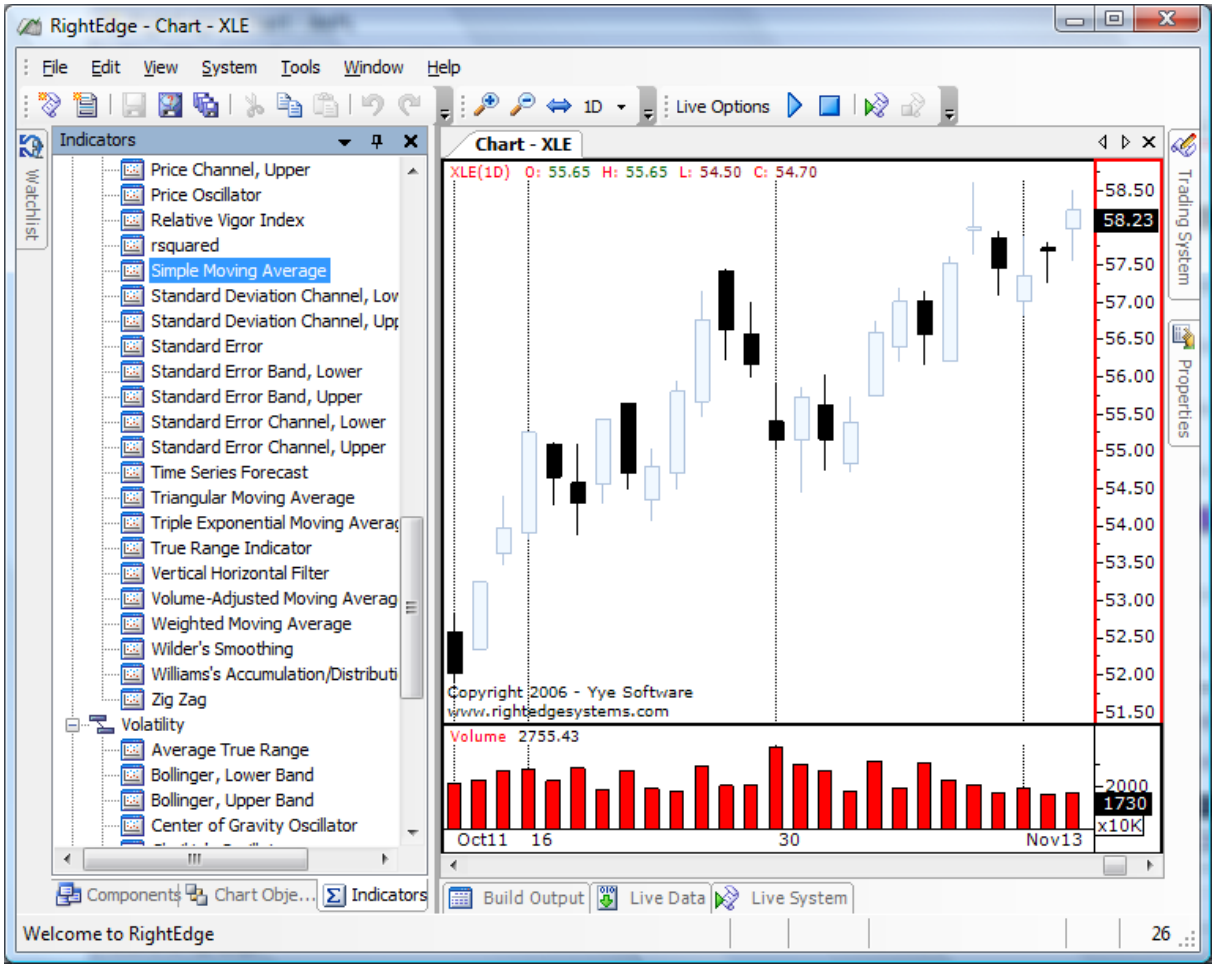
except for that bar data is aggregated to weekly.

Using Indicators

Of course, indicators are tightly coupled with charts. Putting indicators onto a chart is accomplished but a simple drag and drop operation. All of the indicators available for drag and drop and system developers are located in the ***Indicators*** panel. This panel is on by default, but if it cannot be located, select the ***Indicators*** menu option from ***View*** menu.



The indicators are grouped. Out of the box, RightEdge ships with over 80 indicators in five separate groups. For simplicity sake, let's plot a simple moving average (SMA) onto this chart. Click the Simple Moving Average once and hold the left mouse button down. Drop the indicator onto the chart frame and the following dialog is presented:

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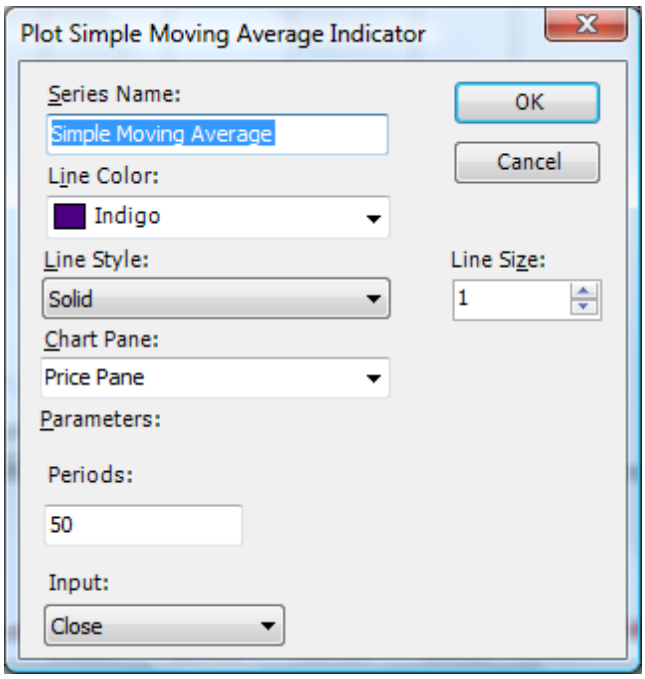

The defaults are presented and clicking OK will plot a 50 period simple moving average onto the chart. It's that simple.

The indicator can be removed from the chart by selecting the indicator with the left mouse button to "highlight" the indicator line and hitting the delete key. The plotted 50 day simple moving average selected is shown below.

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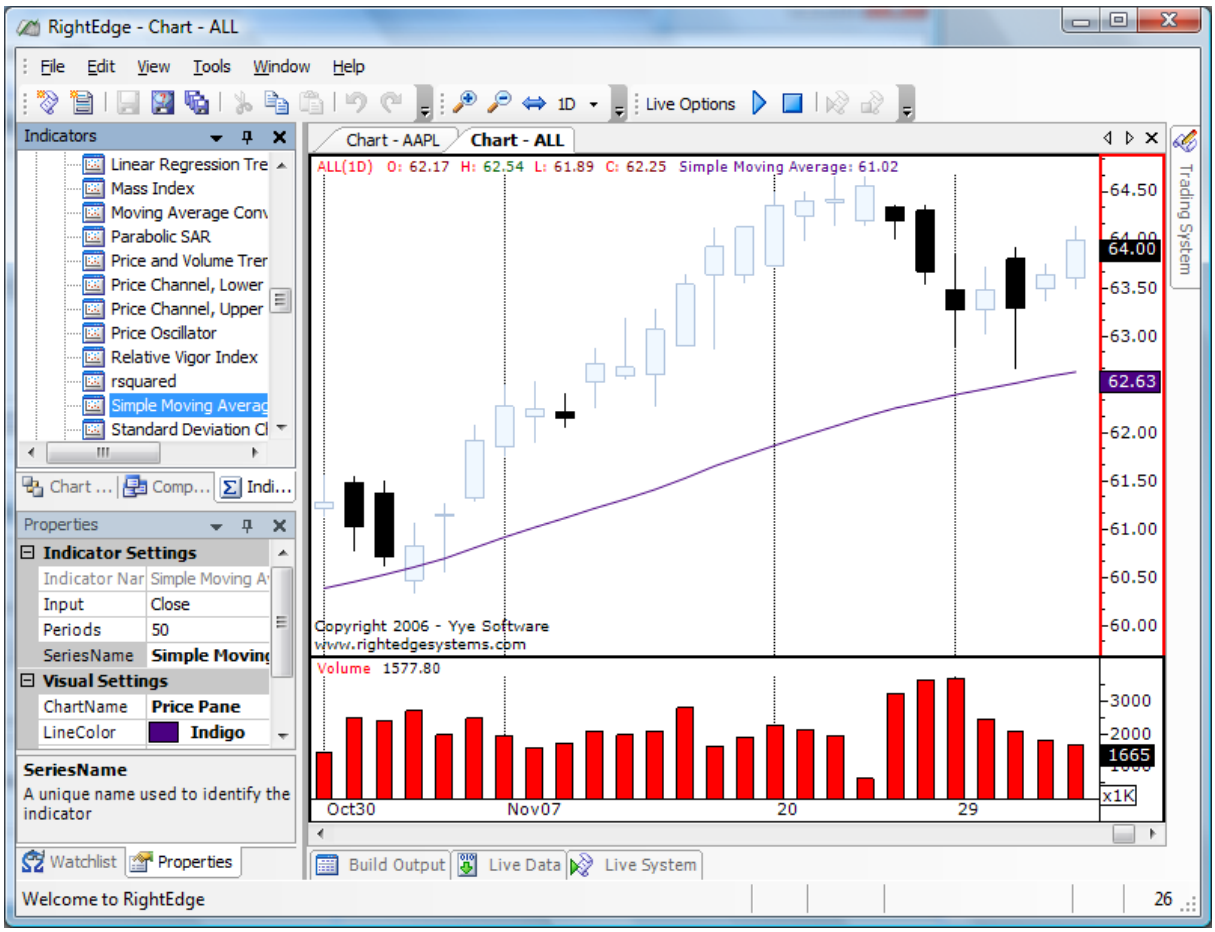

Not all indicators are useful on the price pane of course. When dragging an indicator onto a chart, a default pane is recommended. This pane can be named anything. If the pane name does not exist, a new pane is created. Dragging a Relative Strength indicator onto the chart demonstrates this.

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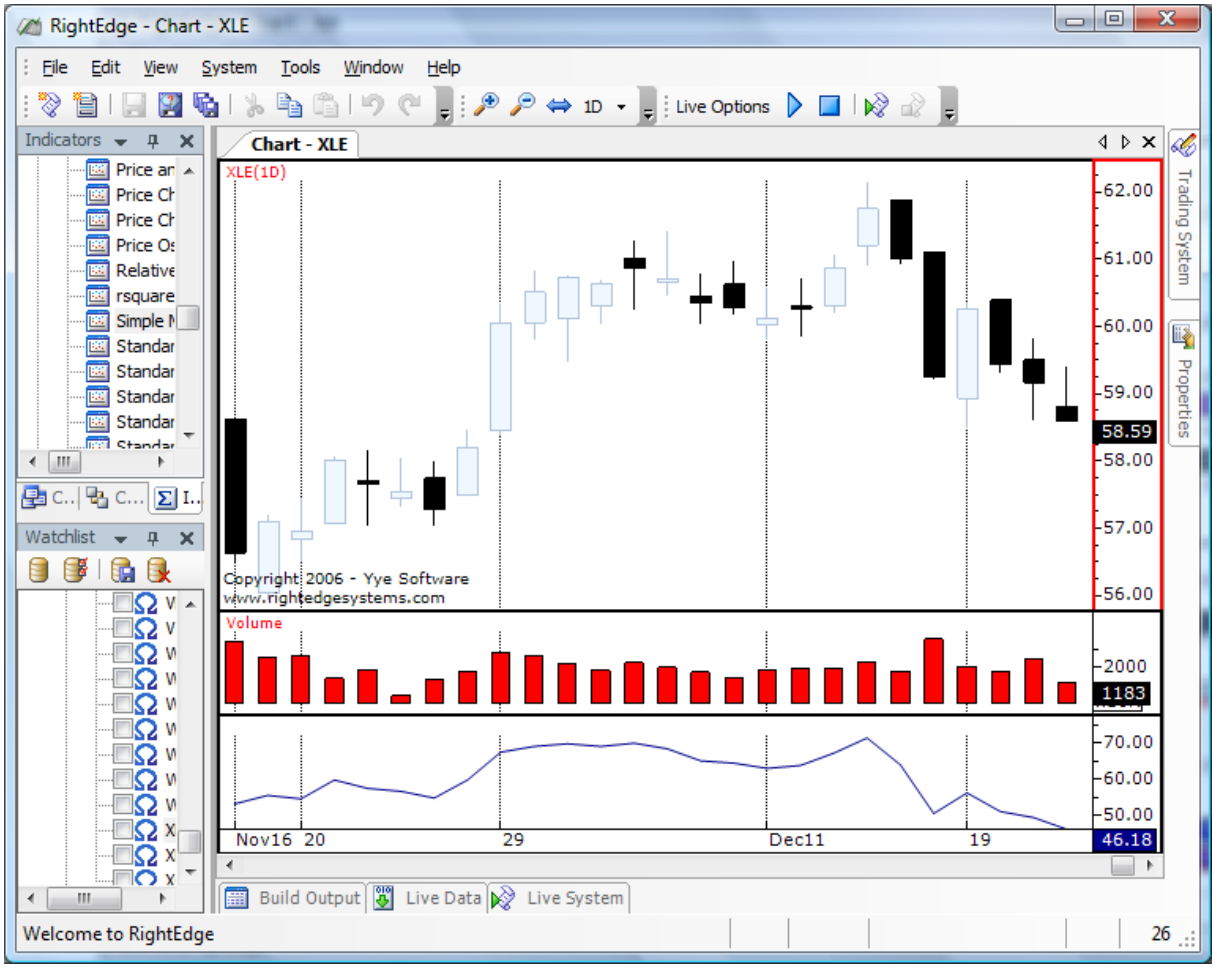

To remove user defined panes, right click in the pane and select ***Close Pane***.

Using Chart Objects

Chart objects encompass all items that are related to shapes and not necessarily price information. Chart objects are used to help identify or outline patterns such as support and resistance lines or channels. Chart objects are useful to both pure technical as well as discretionary traders. The Chart Objects pane is located in the upper left pane by default. If the Chart Objects pane is not visible, select ***Chart Objects*** from ***View*** menu.

The Chart Objects panel breaks the objects down into logical types. Simply click an object heading to expand the group and reveal the underlying available objects. To start, expand the ***Lines*** group. Click the Line object and drag it onto an open chart. Release the mouse button to establish the first point of the line. Move the mouse to change the length and direction of the line.

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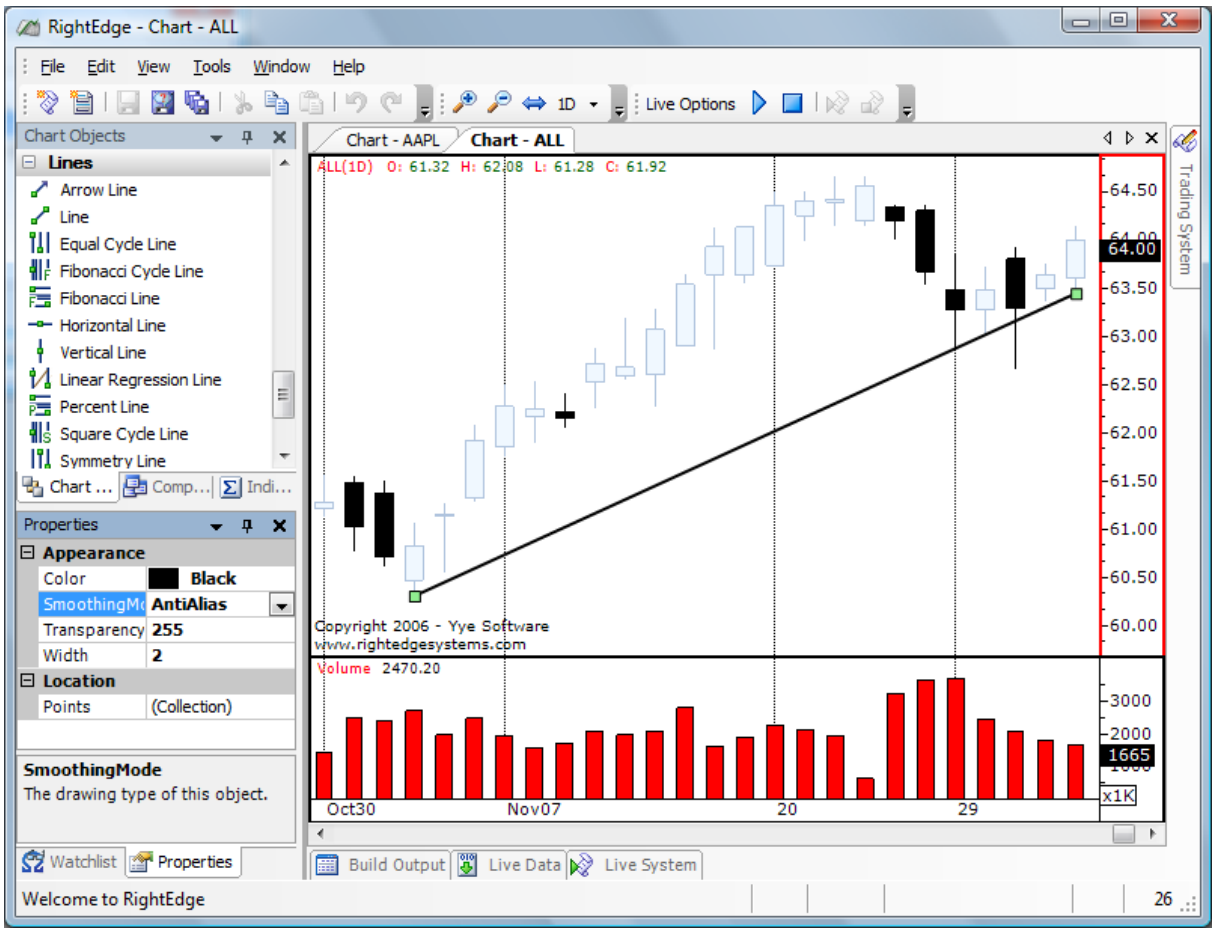

Once the line is in the desired position, click the left mouse button to finish the line creation. Once the line is created, items specific to this object will show in the properties window. Objects that are created using this method are changeable, movable, and can even be removed. To change the direction or size of this line object, click either end of the line on the end points and hold the left mouse button down while moving the mouse. When the mouse is released, the object will snap to its new position. Move towards the middle of the line and a "hand" mouse cursor will appear. Click the left mouse button drag the object to the desired location. Release the mouse button and it will be placed in this location. Hitting the delete key will remove the line object from the chart.

Notice that the chart objects maintain their location. Scrolling the chart will keep the line in its original position. The same holds true for various time frames. If the line was drawn on a chart showing daily bars, then the chart timeframe is switched to weekly, the line will update accordingly.

Object properties are updated in real time. Select the ***Color*** property in the property grid and select any color. The color of the line will change to the selected color. The width indicates how many pixels are used to draw the line. The larger the number, the wider the line. Transparency controls how much of the background is blended with the object. The range is 0 through 255. 0 indicates complete transparency, in other words, an invisible object. 255 indicates that the line will be solid and the background of the chart will not show through. To demonstrate how all of these settings effect this simple line, change the width to 3, the transparency value to 40 and the Smoothing Mode to Anti Alias. With these settings, it's quite obvious how a support or resistance line could be drawn without

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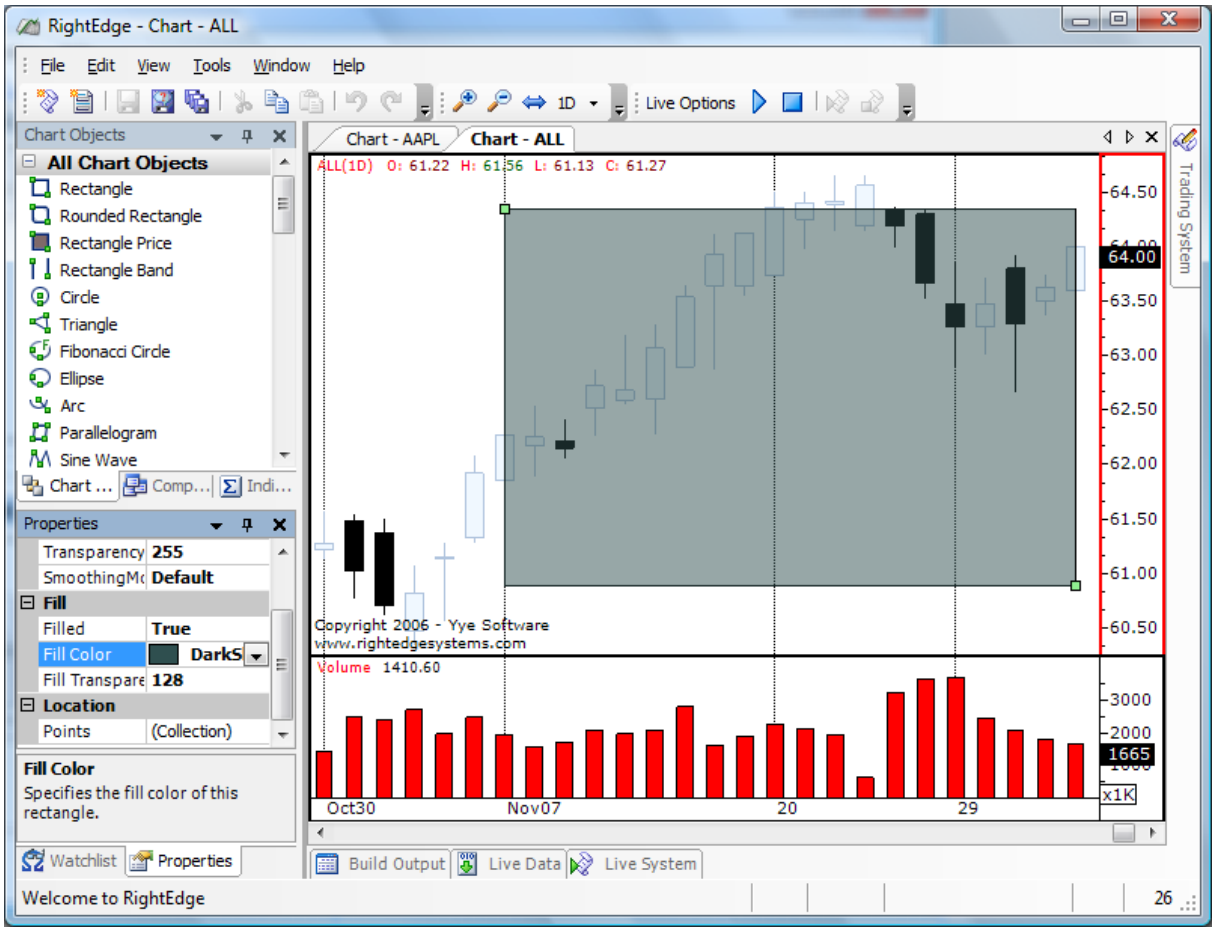
getting in the way of the price movement.

The chart objects also support basic shapes such as circles, rectangles, ellipses, and parallelograms. Expand the ***Basic Shapes*** chart object group and drag a Rounded Rectangle onto the chart. There are more properties for this object as shown below.



In this example, the line color was changed to dark gray. The ***Filled*** flag was set to true, the fill color to light green and fill transparency to 120.

To demonstrate a more complicated object and show how several objects might work together, go back to the ***Lines*** object group and drag a Fibonacci Line onto the chart. Set the properties for this object as shown below.

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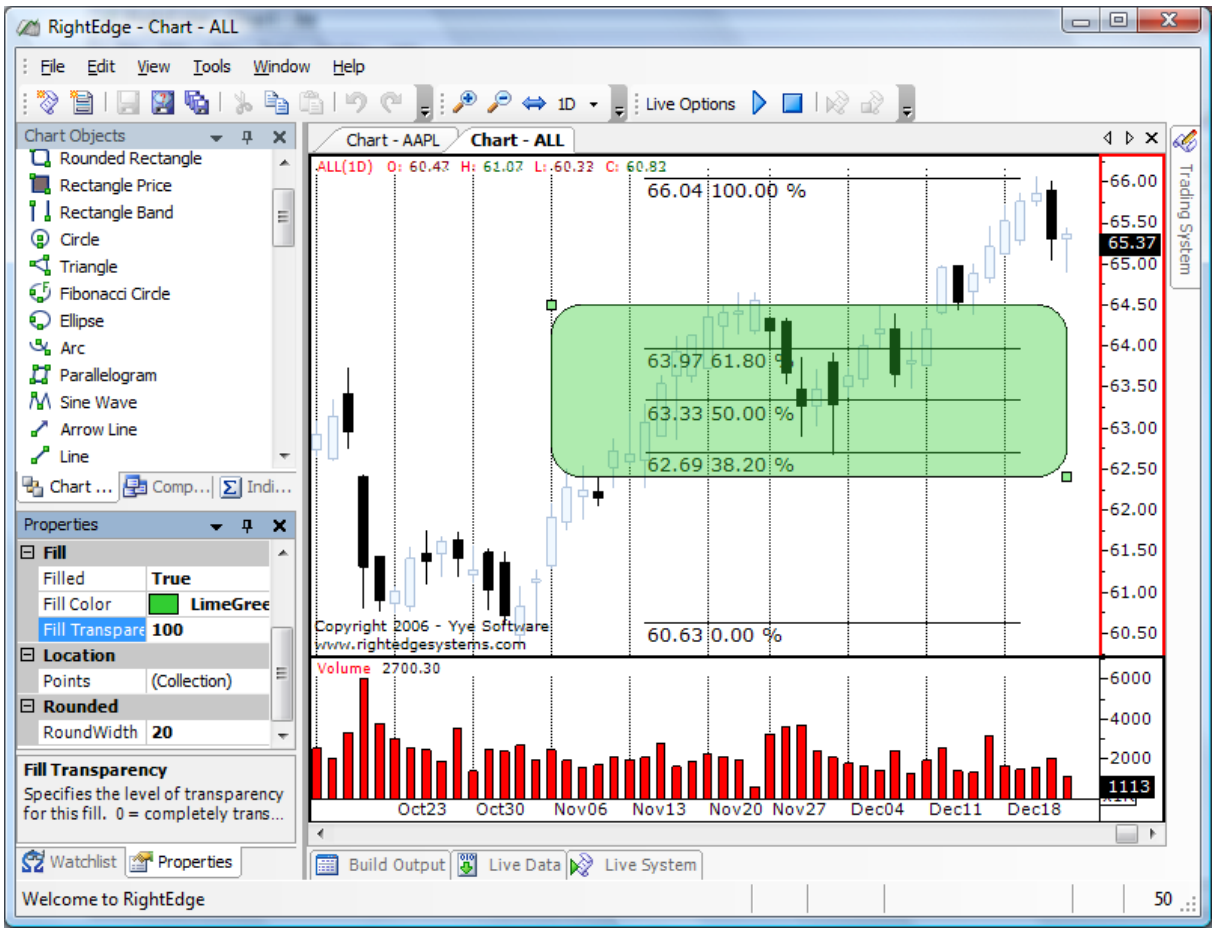

The Fibonacci line draws lines at the well known Fibonacci retracement values. Stretch the rounded rectangle to highlight these important retracements. It now becomes clear when the price penetrates that retracement area. All of these objects are still not in the way of the price bars.

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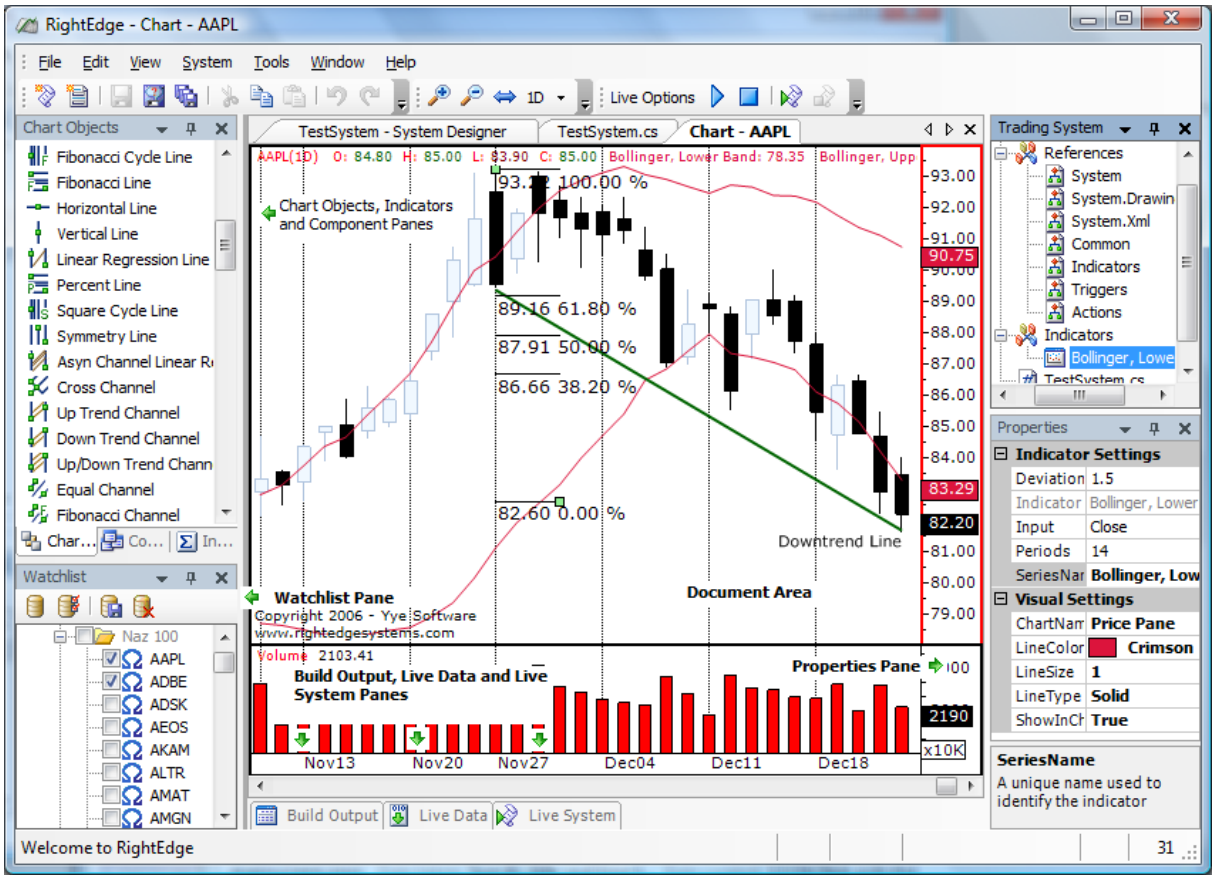
4 Using the RightEdge Environment

RightEdge uses cutting edge user interface components so that relevant information is available at all times. The RightEdge environment consists of dockable windows, floating windows, dockable menus and toolbars and a document manager with "tear-away" tabs. There are many aspects about the user interface that are customizable. First, let's get acquainted with the panes that are available.



The illustration above shows all of the panes available in RightEdge. The most important area of the application is the ***Document Area***. The document area houses a variety of documents that can be called up in RightEdge. In the above example, a chart current exists in the document area. Other items that are considered documents are source code files, the Project form (used in drag and drop system building) and the System Results document.

Hiding/Pinning and Unhiding/Unpinning Panes

Each pane in RightEdge can be hidden or shown at any time.

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The example above shows all of the panes in RightEdge hidden with the exception of the Properties pane which has "flown out". The pin in the upper right hand corner, when pressed, will make the pane a part of the current window. When unpinned, the pane will disappear to the nearest edge of the main window. When the mouse is rolled over the pane title, the pane will "fly out" where it can be pinned again. If unpinned and the mouse leaves the pane area, the pane will hide itself again.

Docking Panes

Each pane in RightEdge can be hidden or shown at any time. In addition this a pane can be docked inside of another pane or to the top, bottom, left or right of the edge of the main window.

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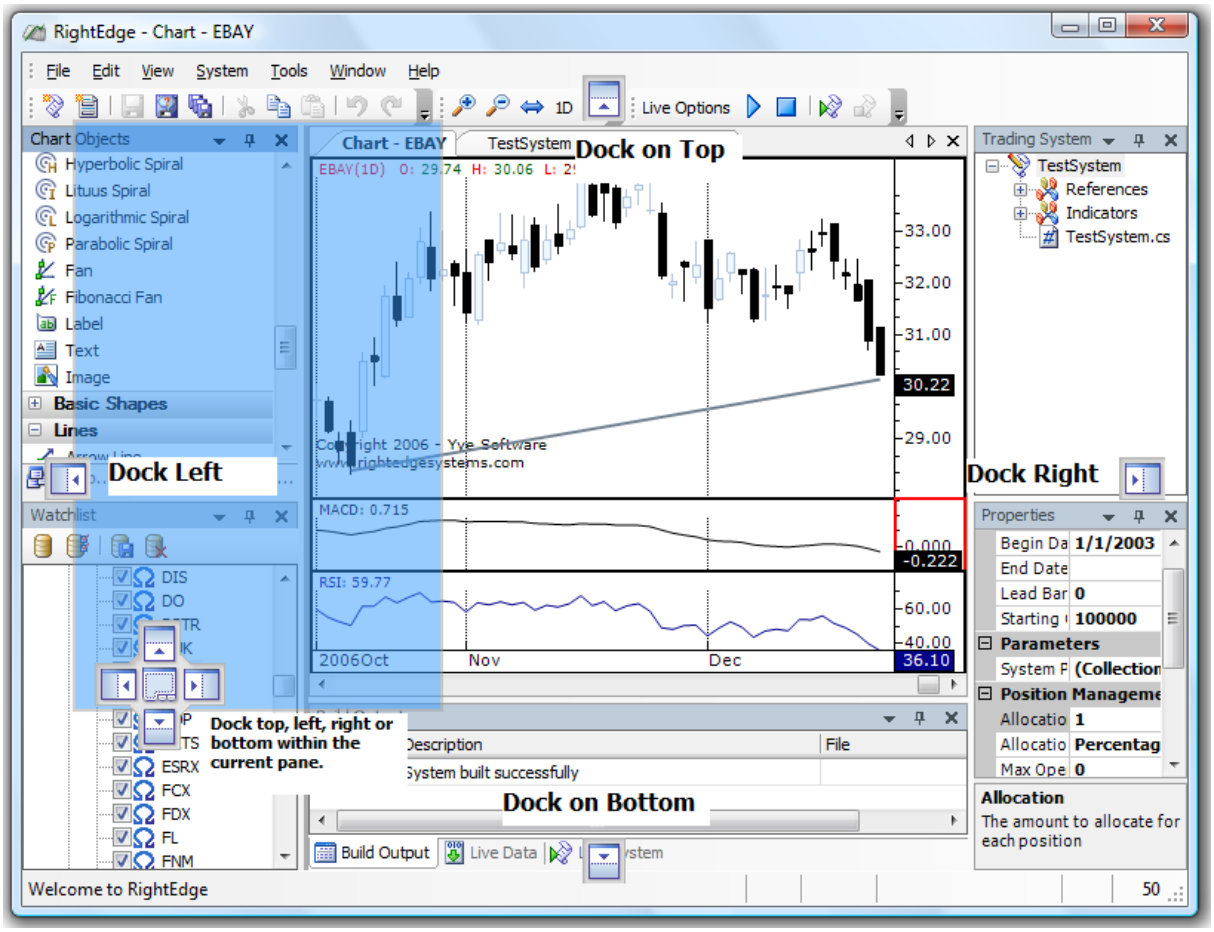

Use the left mouse button and click and hold the tab area of the pane. When a drag on the tab occurs, the pane will become transparent and docking arrows will be displayed as shown above. Move the mouse cursor on top of any of these arrows to perform the dock operation. Hit the Escape key to cancel the drag operation. To undock a pane and specify that it should not be docked with any other, hold the Control key before beginning the drag operation.

Document Area

As mentioned previously, the document area will contain document like items such as charts and source files. Documents cannot be docked within other panes, however, documents can be split within the document area or "float". Click the tab area of the document with the left mouse button and begin to drag the tab.

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The sample above shows two charts that are stacked horizontally along with another chart that is floating outside of the main RightEdge window.

Floating documents are particularly useful in a both a chart or source file situation, especially in a multiple monitor environment.

Note: Pane layout is persisted between instances of RightEdge. Documents are not persisted between instances.

See Also

Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Live Data Pane
Live System Pane
Chart Objects Pane
Build Output Pane

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5 Developing Trading Systems in RightEdge

Developing Trading Systems in RightEdge

RightEdge supports trading systems written in Visual Basic.NET or C#. It also provides a drag and drop system designer which can be used to create simple trading systems, or to set up the objects (such as indicators and triggers) that your Visual Basic or C# code will use. See the "New Trading System" and "Trading System Pane" help topics for information about creating, opening, and managing a trading system.

Brief Introduction

This section gives a quick introduction to writing systems in RightEdge through various examples. Later sections will go into more detail on specific topics. The samples are shown in both C# and Visual Basic.NET.

C#

```
public class MySymbolScript : MySymbolScriptBase
{
        public override void NewBar()
        {
                if (Close.Current < Open.Current)
                {
                        // Open a position on a down bar
                        OpenPosition(PositionType.Long, OrderType.Market);
                }
        }
}
```

Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Public Overloads Overrides Sub NewBar()
          If Close.Current < Open.Current Then
               ' Open a position on a down bar
               OpenPosition(PositionType.Long, OrderType.Market)
          End If
     End Sub
End Class
```

The NewBar method inside your symbol script class runs after each bar. If the close of the bar is less than the open, this system submits a market order to open a long position. You can specify the size of the position here, but if you don't it will be determined by the allocation settings in the system properties.

In the examples that follow, we will usually just show the code that goes inside the NewBar method, without the class and method definitions, which don't change.

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C#

```
// We need at least two bars
if (Bars.Count < 2)
        return;

if (Close.Current < Open.Current &&
        Close.LookBack(1) < Open.LookBack(1))
{
        // Open a position after two down bars in a row.
        OpenPosition(PositionType.Long, OrderType.Market);
}
```

Visual Basic.NET

```
' We need at least two bars
If Bars.Count < 2 Then
     Return
End If

If Close.Current < Open.Current AndAlso Close.LookBack(1) <
Open.LookBack(1) Then
     ' Open a position after two down bars in a row.
     OpenPosition(PositionType.Long, OrderType.Market)
End If
```

This example shows how to reference previous bar data. It opens a position after two down bars. Note that first it checks to make sure that there are at least two bars. Without this check an error would be generated on the first bar, when the system tries to access the previous bar which isn't available. You can use series corresponding to the bar element you want (Open, High, Low, Close, Volume), or you can use the Bars series to access a bar and then access its members. Use the LookBack method to access previous values of a series. The Current method retrieves the current value of a series, and is the same as calling LookBack(0).

C#

```
int testBars = 5;
int downBarsNeeded = 4;
if (Bars.Count < testBars)
        return;

int downBars = 0;
for (int i = 0; i < testBars; i++)
{
        if (Close.LookBack(i) < Open.LookBack(i))
        {
                downBars++;
        }
}
```

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```
if (downBars >= downBarsNeeded)
{
        OpenPosition(PositionType.Long, OrderType.Market);
}
```

Visual Basic.NET

```
Dim testBars As Integer = 5
Dim downBarsNeeded As Integer = 4
If Bars.Count < testBars Then
     Return
End If

Dim downBars As Integer = 0
For i As Integer = 0 To testBars - 1
     If Close.LookBack(i) < Open.LookBack(i) Then
          downBars += 1
     End If
Next

If downBars >= downBarsNeeded Then
     OpenPosition(PositionType.Long, OrderType.Market)
End If
```

This example shows how you can loop through the previous bars and perform some calculation. In this case, it is counting the number of down bars over the previous 5 bars. If there are 4 or more down bars, then a position will be opened.

You can add indicators to your system by dragging them to the System Designer or to the Trading System Pane. Once you have done so, it is easy to access them from within your system. The following code uses an indicator named WidnerLowerBand. (or "Widner Lower Band" - the spaces are automatically removed in the name you use to access the indicator from your system code.)

C#

```
OpenPosition(PositionType.Long, OrderType.Limit,
WidnerLowerBand.Current);
```

Visual Basic.NET

```
OpenPosition(PositionType.Long, OrderType.Limit, WidnerLowerBand.Current)
```

This example submits a limit order with a limit price equal to the value of the WidnerLowerBand indicator. By default, open position orders are cancelled after one bar, so there will always be a single limit order active with a limit price equal to the value of the WidnerLowerBand indicator on the previous bar. You can also create an indicator in code instead of using the system designer. You just declare an indicator as a member of your class, and initialize it in the Startup method. The following example shows how to create a lower Bollinger Band of the close price and use it to place limit orders.

C#

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```
public class MySymbolScript : MySymbolScriptBase
{
        BollingerBandLower bbLower;

        public override void Startup()
        {
                bbLower = new BollingerBandLower(14, 3);
                bbLower.SetInputs(Close);
                bbLower.ChartSettings.Color = Color.Brown;
        }

        public override void NewBar()
        {
                OpenPosition(PositionType.Long, OrderType.Limit,
bbLower.Current);
        }
}
```

Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Private bbLower As BollingerBandLower

     Public Overloads Overrides Sub Startup()
          bbLower = New BollingerBandLower(14, 3)
          bbLower.SetInputs(Close)
          bbLower.ChartSettings.Color = Color.Brown
     End Sub

     Public Overloads Overrides Sub NewBar()
          OpenPosition(PositionType.Long, OrderType.Limit,
bbLower.Current)
     End Sub
End Class
```

RightEdge Trading System Architecture

RightEdge trading systems use an event driven architecture. This means that when an event (such as a new bar, filled order, or new tick) occurs, a corresponding method in the trading system is called. This design allows the same code to be used for backtesting and live trading. In addition, it does not provide access to price or other data "from the future" while backtesting, preventing systems from accidentally using this data to make trading decisions and providing unrealistic results.

RightEdge trading systems can operate on multiple symbols. When you create a trading system, two classes will be created for you. The MySystem class is for your system-level logic, and only one copy of this class will be created when the system is run. The MySymbolScript class is for your symbol-level logic, and there will be a copy of this class

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created for each symbol in your system symbols. Most of your code will probably go in your symbol script class, and if you don't need to store any custom system-level data, you may not add any code to the system class at all.

Below is what what the empty symbol script class created when you create a system will look like.

C#

```
public class MySymbolScript : MySymbolScriptBase
{
        public override void Startup()
        {
                // Perform initialization here.

        }

        public override void NewBar()
        {
                // Put your trading code here

        }

        public override void OrderFilled(Position position, Trade trade)
        {
                // This method is called when an order is filled

        }

        public override void OrderCancelled(Position position, Order order,
string information)
        {
                // This method is called when an order is cancelled or
rejected

        }
}
```

Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Public Overloads Overrides Sub Startup()
          ' Perform initialization here.

     End Sub

     Public Overloads Overrides Sub NewBar()
          ' Put your trading code here
```

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```
    End Sub

    Public Overloads Overrides Sub OrderFilled(ByVal position As Position,
ByVal trade As Trade)
        ' This method is called when an order is filled

    End Sub

    Public Overloads Overrides Sub OrderCancelled(ByVal position As
Position, ByVal order As Order, ByVal information As String)
        ' This method is called when an order is cancelled or rejected

    End Sub
End Class
```

Accessing Bar Data

You can access bar data using the "Bars" series, or you can use series for the Open, High, Low, Close, and Volume. The Current property returns the current value of a series, and the LookBack method returns previous values. Below is an example of code that computes the difference between the current bar's open price and the previous bar's close price, using both methods of accessing bar data.

C#

```
if (Bars.Count >= 2)
{
        // Compute the change in price from the previous bar's close to
this bar's open
        double diff = Bars.Current.Open - Bars.LookBack(1).Close;
        double diff2 = Open.Current - Close.LookBack(1);
}
```

Visual Basic.NET

```
If Bars.Count >= 2 Then
    ' Compute the change in price from the previous bar's close to this
bar's open
    Dim diff As Double = Bars.Current.Open - Bars.LookBack(1).Close
    Dim diff2 As Double = Open.Current - Close.LookBack(1)
End If
```

Note that this code checks to make sure there are at least two total bars before trying to access the previous bar. Without this check, the code would try to access the previous bar the first time NewBar was called, which would cause an index out of range exception to be thrown.

Opening a Position

To open a position, you can call the OpenPosition method. The simplest overload of this

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method takes a position type and an order type. Other overloads allow you to specify a price (for limit and stop orders), and the size of the position. If you do not specify a size, then the allocation settings will be used to size the position. These can be modified in the system properties, or in code via the PositionManager.UseFixedAmountPerPosition, PositionManager.PercentPerPosition, and PositionManager.FixedAmountPerPosition properties.

The OpenPosition method returns a Position object. There are various errors that may occur when you try to open a position, for example if the limit price was not specified for a limit order, or the maximum number of positions specified in the project properties are already open. You can check if there was an error by checking the Position's Error property. If this property is null, then the order to open the position was submitted successfully. If there was an error, then the Error property will be a string with error information. The code below shows how you can open a position, check if there was an error, and if so add a warning to the output window.

C#

```
Position pos = OpenPosition(PositionType.Long, OrderType.Market);
if (pos.Error != null)
{
        OutputWarning(pos.Error);
}
```

Visual Basic.NET

```
Dim pos As Position = OpenPosition(PositionType.Long, OrderType.Market)
If pos.Error IsNot Nothing Then
     OutputWarning(pos.Error)
End If
```

Note that even if there is no error, the position is not yet open. The order to open the position has been submitted to the broker, but it will be filled at a later time or perhaps not filled at all. A position where the open order has been submitted but not yet filled is called a pending position.

For control over more settings when opening a Position, you can create a PositionSettings object, set its properties, and pass it to the OpenPosition method.

C#

```
PositionSettings settings = new PositionSettings();
settings.PositionType = PositionType.Long;
settings.OrderType = OrderType.Market;
settings.Size = 100;
settings.BarsValid = 5;                 //  Open position order is valid
for 5 bars
settings.ProfitTarget = .10;           //  10% profit target
settings.ProfitTargetType = TargetPriceType.Percentage;
settings.BarCountExit = 30;            //  Close position automatically
after 30 bars
```

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```
OpenPosition(settings);
```

Visual Basic.NET

```
Dim settings As New PositionSettings()
settings.PositionType = PositionType.Long
settings.OrderType = OrderType.Market
settings.Size = 100
settings.BarsValid = 5                          ' Open position order is
valid for 5 bars
settings.ProfitTarget = 0.1                    ' 10% profit target
settings.ProfitTargetType = TargetPriceType.Percentage
settings.BarCountExit = 30                      ' Close position
automatically after 30 bars

OpenPosition(settings)
```

By default, open position orders are automatically cancelled after one bar if they have not been filled. This means that for a band violation style system, for example, you can simply call OpenPosition on each bar with the current limit price, without having to cancel the previous order. You can modify this behavior with the BarsValid property of the PositionSettings. The above code submits an order that is valid for 5 bars. You can set this property to -1 if you do not want the order to be automatically cancelled at all.

Accessing Open, Pending, and Closed Positions

You can access the list of open positions, the pending positions, and the closed positions for the current symbol with the OpenPositions, PendingPositions, and ClosedPositions properties of the symbol script class. The following code shows how you could close all open positions for a symbol if the close of the current bar is less than 75% of the price of the open.

C#

```
if (Close.Current < Open.Current * .75)
{
        foreach (Position pos in OpenPositions)
        {
                pos.CloseAtMarket();
        }
}
```

Visual Basic.NET

```
If Close.Current < Open.Current * 0.75 Then
     For Each pos As Position In OpenPositions
          pos.CloseAtMarket()
     Next
End If
```

Position Exit Conditions

Profit target and stop loss values can be specified as a percentage gain or loss, or as a fixed price target. Default percentage values for profit targets and stop losses can be

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specified in the trading system properties. The default values can be modified from your system code by using the PositionManager.ProfitTarget and PositionManager.StopLoss properties. The following code sets the default profit target to 10% and the default stop loss to 5%.

C#

```
PositionManager.ProfitTarget = 0.10;
PositionManager.StopLoss = 0.05;
```

Visual Basic.NET

```
PositionManager.ProfitTarget = 0.10
PositionManager.StopLoss = 0.05
```

This would change the defaults for new positions, but would not change the profit targets or stop losses for any existing positions.

You can override the defaults when you call OpenPosition by setting the ProfitTarget, ProfitTargetType, StopLoss, and StopLossType properties of the PositionOrder object. The following code uses the close of the current bar plus the current bar's height as the profit target.

C#

```
PositionSettings settings = new PositionSettings();
settings.PositionType = PositionType.Long;
settings.OrderType = OrderType.Market;
settings.ProfitTarget = Close.Current + (High.Current - Low.Current);
settings.ProfitTargetType = TargetPriceType.Price;
OpenPosition(settings);
```

Visual Basic.NET

```
Dim settings As New PositionSettings()
settings.PositionType = PositionType.[Long]
settings.OrderType = OrderType.Market
settings.ProfitTarget = Close.Current + (High.Current - Low.Current)
settings.ProfitTargetType = TargetPriceType.Price
OpenPosition(settings)
```

The Position class also has ProfitTarget, ProfitTargetType, StopLoss, and StopLossType properties which tell you what the current profit target and stop loss are. You can modify these values with the SetProfitTargetPrice, SetProfitTargetPercent, SetStopLossPrice, and SetStopLossPercent methods. The following code sets the stop loss on all open positions to the entry price minus 0.05.

C#

```
foreach (Position pos in OpenPositions)
{
        pos.SetStopLossPrice(pos.EntryPrice.SymbolPrice - 0.05);
}
```

Visual Basic.NET

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```
For Each pos As Position In OpenPositions
     pos.SetStopLossPrice(pos.EntryPrice.SymbolPrice - 0.05)
Next
```

A profit target or stop loss for an open position is represented by a limit or stop order with the broker. When you change the value, the existing order is cancelled and a new one is submitted for the new price. Likewise, if the position size changes, RightEdge will cancel the existing profit target and stop loss orders and submit new ones with the updated size.

In addition to the profit target and stop loss, a bar count exit can be used to automatically close a position after a certain number of bars since it was opened. The default value can be set in the trading system properties or with the PositionManager.BarCountExit property. You can also set the BarCountExit property of the PositionSettings or Position class. The BarCountExit property of the Position class represents the number of bars remaining- it decreases by one each bar and when it reaches zero, the position is closed.

Order Management

You can submit your own orders for a position using the Position class's SubmitOrder method. This allows you to resize or close a position based on your own logic. Unless otherwise specified, the order you submit will only be valid for one bar. The following line submits an order to close half of a position.

C#

```
pos.SubmitOrder(pos.CurSize / 2, TransactionType.Sell, OrderType.Market, 0);
```

Visual Basic.NET

```
pos.SubmitOrder(pos.CurSize / 2, TransactionType.Sell, OrderType.Market, 0)
```

You can also create an OrderSettings object and pass it to the SubmitOrder method for more control over the order that is submitted. The SubmitOrder method returns an Order object. Similar to the Position returned from OpenPosition, the Order object has an Error property which you can use to determine whether the call was successful, and if not, why. If the call was successful the Error property will be null. Otherwise the Error property be set to a string with error information.

When an order is filled, the OrderFilled method in your symbol script class will be called. The following sample shows an example of using this method. When the initial order to open a position is filled, it submits a limit order to double the size of the position if the price drops 5% from the entry price of the position.

C#

```
public override void OrderFilled(Position position, Trade trade)
{
        //     This method is called when an order is filled
        if (trade.TradeType == TradeType.OpenPosition)
        {
```

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```
                OrderSettings settings = new OrderSettings();
                settings.Size = position.CurSize;
                settings.TransactionType = TransactionType.Buy;
                settings.OrderType = OrderType.Limit;
                settings.LimitPrice = position.EntryPrice.SymbolPrice *
0.95;
                settings.BarsValid = -1;         //     Order should not
time out
                settings.Description = "Buy more";
                Order order = position.SubmitOrder(settings);
                if (order.Error != null)
                {
                        OutputWarning(order.Error);
                }
        }
}
```

Visual Basic.NET

```
Public Overloads Overrides Sub OrderFilled(ByVal position As Position, ByVal
trade As Trade)
     ' This method is called when an order is filled
     If trade.TradeType = TradeType.OpenPosition Then
          Dim settings As New OrderSettings()
          settings.Size = position.CurSize
          settings.TransactionType = TransactionType.Buy
          settings.OrderType = OrderType.Limit
          settings.LimitPrice = position.EntryPrice.SymbolPrice * 0.95
          settings.BarsValid = -1           ' Order should not time out
          settings.Description = "Buy more"
          Dim order As Order = position.SubmitOrder(settings)
          If order.Error IsNot Nothing Then
               OutputWarning(order.Error)
          End If
     End If
End Sub
```

Similarly, the OrderCancelled method is called when an order is cancelled. The following sample uses this method to output a warning if an order is cancelled without RightEdge having requested the cancellation. This can happen if the broker rejects the order, or if you manually cancel the order using another program.

C#

```
public override void OrderCancelled(Position position, Order order, string
information)
{
        //     This method is called when an order is cancelled or
rejected
```

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```
        if (!order.CancelPending)
        {
                OutputWarning("Order cancelled unexpectedly: " +
information);
        }
}
```

Visual Basic.NET

```
Public Overloads Overrides Sub OrderCancelled(ByVal position As Position,
ByVal order As Order, ByVal information As String)
     ' This method is called when an order is cancelled or rejected
     If Not order.CancelPending Then
          OutputWarning("Order cancelled unexpectedly: " + information)
     End If
End Sub
```

The position class has an Orders property which is a list of all the pending orders. If an open position has a profit target and a stop loss, there will be an order in this list corresponding to each one. Any user-submitted orders will also be in the list. The TradeType property of the Order can be used to distinguish between these types of orders. It is an enumeration with the following values: UserSubmitted, OpenPosition, ClosePosition, ProfitTarget, StopLoss, and TrailingStop. The following code sample cancels all pending user-submitted orders on all open positions.

C#

```
foreach (Position pos in OpenPositions)
{
        foreach (Order order in pos.Orders)
        {
                if (order.TradeType == TradeType.UserSubmitted)
                {
                        order.CancelOrder();
                }
        }
}
```

Visual Basic.NET

```
For Each pos As Position In OpenPositions
     For Each order As Order In pos.Orders
          If order.TradeType = TradeType.UserSubmitted Then
               order.CancelOrder()
          End If
     Next
Next
```

Indicators

RightEdge includes over 100 built-in technical indicators, and uses a plugin architecture which allows you to write your own indicators or obtain them from a third party. You can

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manage the indicators in your system by drag and drop in the System Designer, or you can create them in code.

The available indicators are listed in the Indicator toolbox. If the toolbox is not visible, you can show it by selecting "Indicators" from the view menu. To add an indicator to your system, drag it onto the System Designer window. This window is opened automatically when you open a system, and can be reopened from the view menu if you close it. The settings for an indicator (such as its input values or period) are displayed below the indicator. You can double-click on these values to change them, and the indicator name can also be changed by double-clicking on it. You can also modify an indicator's properties by selecting it and using the properties toolbox. In addition, the properties toolbox will allow you to set visual settings such as the indicator color and line type.

To access an indicator from within your trading system code, simply refer to it by its name, with spaces (and other non-permitted characters) removed. For example, if you create a Widner Lower Band, the default name will be "Widner Lower Band", and you would refer to it in your code as "WidnerLowerBand". Assuming you have this indicator added to your system, the following code shows how to submit a limit order based on the indicator's value.

C#

```
OpenPosition(PositionType.Long, OrderType.Limit,
WidnerLowerBand.Current);
```

Visual Basic.NET

```
OpenPosition(PositionType.Long, OrderType.Limit, WidnerLowerBand.Current)
```

You can copy drag and drop indicators from your system to a quick chart. The drag and drop indicators are listed in the tree in the Trading System toolbox. You can drag them onto a chart, or drag the "Indicators" node of the tree to add all of the trading system indicators to a chart. If you have added some indicators to a chart and would like to copy them to your system, you can right click on the chart and select "Add Indicators to System."

You can also create your indicators entirely in code if you prefer. Create fields of your trading script class for each indicator, and initialize the indicators in the Startup method. The following example is a band violation system using a 14-period, 3 standard deviation Bollinger Band of the close price.

C#

```
public class MySymbolScript : MySymbolScriptBase
{
        BollingerBandLower bbLower;

        public override void Startup()
        {
                bbLower = new BollingerBandLower(14, 3);
                bbLower.SetInputs(Close);
                bbLower.ChartSettings.Color = Color.Brown;
        }
```

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```
        public override void NewBar()
        {
                OpenPosition(PositionType.Long, OrderType.Limit,
bbLower.Current);
        }
}
```

Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Private bbLower As BollingerBandLower

     Public Overloads Overrides Sub Startup()
          bbLower = New BollingerBandLower(14, 3)
          bbLower.SetInputs(Close)
          bbLower.ChartSettings.Color = Color.Brown
     End Sub

     Public Overloads Overrides Sub NewBar()
          OpenPosition(PositionType.Long, OrderType.Limit,
bbLower.Current)
     End Sub
End Class
```

As with other series, you can use the Current property to retrieve the current value of an indicator, and the LookBack method to retrieve previous values. The ChartSettings property of an indicator allows you to control how the indicator will be drawn on the chart. It includes settings for the series color, display name, and line type and size. You can set ChartSettings.ShowInChart to false if you do not want the indicator added to the charts.

Indicator Chaining

You can use one indicator as the input for another. The following example calculates the average true range by using a simple moving average on the true range. RightEdge does have an Average True Range indicator built in, but it uses an exponential moving average instead of a simple moving average.

C#

```
public class MySymbolScript : MySymbolScriptBase
{
        public TrueRange trueRange = new TrueRange();
        public SMA ATR = new SMA(25);

        public override void Startup()
        {
```

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```
            ATR.SetInputs(trueRange);

            trueRange.ChartSettings.ShowInChart = false;
            ATR.ChartSettings.ChartPaneName = "TrueRange";
        }
}
```

Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Public trueRange As New TrueRange()
     Public ATR As New SMA(25)

     Public Overloads Overrides Sub Startup()
          ATR.SetInputs(trueRange)

          trueRange.ChartSettings.ShowInChart = False
          ATR.ChartSettings.ChartPaneName = "TrueRange"
     End Sub
End Class
```

User Series

If you want to calculate values in your system and show them on the chart, you can use a UserSeries. You use UserSeries in much the same way as indicators, except that you can set the Current property, and use the SetValue method to set previous values of the series. The following example draws a series with the change in price from the close to the open divided by the height of the bar.

C#

```
public class MySymbolScript : MySymbolScriptBase
{
        UserSeries mySeries;

        public override void Startup()
        {
            mySeries = new UserSeries();
            mySeries.ChartSettings.ChartPaneName = "MySeriesPane";
            mySeries.ChartSettings.Color = Color.Red;
            mySeries.ChartSettings.DisplayName = "My Ratio";
        }

        public override void NewBar()
        {
            mySeries.Current = (Close.Current - Open.Current) /
                    (High.Current - Low.Current);
        }
}
```

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Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Private mySeries As UserSeries

     Public Overloads Overrides Sub Startup()
          mySeries = New UserSeries()
          mySeries.ChartSettings.ChartPaneName = "MySeriesPane"
          mySeries.ChartSettings.Color = Color.Red
          mySeries.ChartSettings.DisplayName = "My Ratio"
     End Sub

     Public Overloads Overrides Sub NewBar()
          mySeries.Current = (Close.Current - Open.Current) /
(High.Current - Low.Current)
     End Sub
End Class
```

Working with Multiple Symbols

With RightEdge, it is easy to run your system for multiple symbols. Simply select multiple symbols in the watchlist and run your system. When you run a system with more than one symbol, a copy of your SymbolScript class is created for each of the symbols. This means that your code can be written for one symbol and it will work with multiple symbols without any extra work. However, if you do want to write logic that involves multiple symbols, you can.

The Symbol property of the symbol script class is the symbol corresponding to that instance (or copy) of the class. The OtherSymbols property allows you to access the symbol script objects corresponding to other symbols. The following example does not trade for QQQQ, but for all other symbols it opens a position if QQQQ had an up bar.

C#

```
if (Symbol.Name == "QQQQ")
{
        //  Don't do any trading for this symbol
        return;
}

BarData QQQQBar = OtherSymbols["QQQQ"].Bars.Current;
if (QQQQBar.Close > QQQQBar.Open)
{
        OpenPosition(PositionType.Long, OrderType.Market);
}
```

Visual Basic.NET

```
If Symbol.Name = "QQQQ" Then
     ' Don't do any trading for this symbol
     Return
```

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```
End If

Dim QQQQBar As BarData = OtherSymbols("QQQQ").Bars.Current
If QQQQBar.Close > QQQQBar.Open Then
     OpenPosition(PositionType.[Long], OrderType.Market)
End If
```

You can use either an instance of the Symbol class or the symbol name as a string in the indexer for the OtherSymbols property. If the symbol wasn't included in the system run, an exception will be thrown. In this case, if you ran the system without having QQQQ checked in the watch list, you would get an exception that would say "No symbol found with requested name: QQQQ."

You can also use series from other symbols as inputs. The following example uses a DivideSeries indicator. For MSFT, this indicator is MSFT's close divided by GOOG's close, while for GOOG, the indicator is GOOG's close divided by MSFT's close.

C#

```
public class MySymbolScript : MySymbolScriptBase
{
        public DivideSeries Ratio = new DivideSeries();

        public override void Startup()
        {
                if (Symbol.Name == "MSFT")
                {
                        Ratio.SetInputs(Close, OtherSymbols["GOOG"].Close);
                }
                else if (Symbol.Name == "GOOG")
                {
                        Ratio.SetInputs(Close, OtherSymbols["MSFT"].Close);
                }

                Ratio.ChartSettings.ChartPaneName = "Ratio";
        }
}
```

Visual Basic.NET

```
Public Class MySymbolScript
     Inherits MySymbolScriptBase
     Public Ratio As New DivideSeries()

     Public Overloads Overrides Sub Startup()
          If Symbol.Name = "MSFT" Then
               Ratio.SetInputs(Close, OtherSymbols("GOOG").Close)
               ElseIf Symbol.Name = "GOOG" Then
               Ratio.SetInputs(Close, OtherSymbols("MSFT").Close)
```

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```
            End If

            Ratio.ChartSettings.ChartPaneName = "Ratio"
        End Sub
End Class
```

Note that you will get an error if you include any symbols besides GOOG and MSFT when you run this system, because the inputs to the DivideSeries indicator would not be set. If you use an indicator from one symbol as an input to an indicator for another symbol, you need to make sure the indicator has been created before you use SetInputs to set it as an input to another indicator. The easiest way to do this is to call the constructor on the same line you declare the indicator, and call the SetInputs method from the Startup method.

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6 Analyzing System Results

The System Results screen contains a great deal of information and also a great deal of flexibility when deciding how to utilize the information. This topic will deal with interpreting the information as well as managing it for your needs with features such as exporting and printing. This section is broken up into two main areas. The first area describes the functionality presented within the system results and the second area goes into detail about the information that is presented.

1. Manipulating System Results
2. Interpreting System Results
   a. Summary
   b. System Parameters
   c. Position List
   d. Trade List
   e. Symbol Results
   f. Scan
   g. Charts

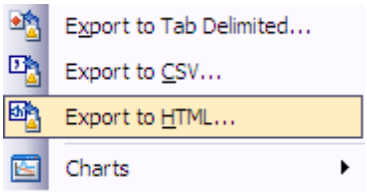
Manipulating System Results

When a simulation has completed, the system results are displayed in the document area of RightEdge. The System Results document contains multiple tabs each assessing different aspects of the simulation.

System Results tabs are external plugins that can be toggled on and off. See the System Results screen documentation for more information on loading plugins from third parties and toggling existing system result screens on and off.

Each tab contains features that are common. These features can be accessed using a combination of items on the context menus and items in the main menu. The statistics windows, which are those windows that contain textual information as opposed to graphical information, have ability to export to common formats as well as print.

When a grid is displayed, right click on the grid area.



This context menu will allow for exporting. Supported formats are tab delimited, CSV (common separated) and HTML. This menu also facilitates displaying system results charts that are not displayed by default. For more information on configuring system results default charts, see System Results Options.

Each of the grids can also be printed. Select the desired tab and select ***Print...*** from the ***File*** menu.

The grids columns for the Trade List, Symbols Results and Scan tabs can also be manipulated and sorted. To sort, click any of the column headings. Click once to sort

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ascending and click the same column again to sort descending. To move a grid column into another position, click the column heading and hold the left mouse button down. Drag the column to the desired location and release the mouse button.

Interpreting System Results

Each tab represents the results of the simulation. The textual versions of the result breakdowns are in the first four tabs titled Summary, Trade List, Symbol Results and Scan. Click any of the areas to retrieve more information.

Summary

The summary tab contains a list of totals broken down horizontally into all trades (long & short combined), long only trades, short only trades and buy and hold. The vertical breakdown groups information about this simulation into manageable categories.

Capital Summary

Starting Capital	The amount of capital set in the simulation to begin with.
Ending Capital	The total amount of capital that is in the account after all trades are placed. This will include the starting capital.
Net Profit ($)	The total amount of profit or loss represented as currency.
Net Profit (%)	The total amount of profit or less represented as a percentage against the starting capital.
APR	The calculated annual percentage return of the profit or loss.
Exposure	The average exposure of capital to the market.

System Totals

Number of Trades	The total number of trades the simulation opened.
Maximum Profit	The highest profit achieved for all trades in the group.
Maximum Loss	The largest loss encountered over all trades in the group.
Average Profit ($)	The average profit from a currency standpoint over all trades in the group.

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Average Profit (%)	The average profit from a percentage standpoint over all trades in the group.
Average Bars Held	The average number of periods that a position was held over all trades in the group.
Maximum Exposure	The maximum value exposed to the market represented as currency.
Max Exposure (%)	The maximum value exposed to the market represented as a percentage.
Max Exposure Date	The date when the maximum currency exposure occurred.
Max Exposure (%) Date	The date when the maximum percentage exposure occurred.
Max Drawdown ($)	The maximum drawdown encountered during this simulation represented as currency.
Max Drawdown (%)	The maximum drawdown encountered during this simulation represented as a percentage.
Max Drawdown Date	The date when the maximum currency drawdown occurred.
Max Drawdown (%) Date	The date when the maximum percentage drawdown occurred.
Winning Totals	
Winning Trades	The number of trades where the profit is greater than 0. Trades that break even are considered losing trades.
Winning %	The percentage of trades where the profit is greater than 0.
Gross Profit	The total amount of profit represented as currency.
Average Profit ($)	The average amount of profit represented as currency.
Average Profit (%)	The average amount of profit represented as a percentage.
Average Bars Held	The average number of periods each winning position was open.
Consecutive Winners	The number of winning trades in a row.
Losing Totals	
Losing Trades	The number of trades where the profit was less than or equal to 0. Trades that break even are considered losing trades.
Losing %	The percentage of trades where the profit is than or equal to 0.
Gross Loss	The total value lost represented as currency.
Average Loss ($)	The average amount lost represented as

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	currency.
Average Loss (%)	The average amount lost represented as a percentage.
Average Bars Held	The average number of periods each losing position was open.
Consecutive Losers	The number of losing trades in a row.

System Parameters

This tab contains information about this particular system run.

Run Date	The date and time the system was run.
Run Length	The amount of time taken to complete the system execution.
System Parameters	This contains a list of all optimization parameters contained within the system and the value of those parameters for this run.

Position List

The position list contains each trade aggregated into its respective position. Positions are nothing more than a grouping of trades. This screen shows the trades grouped by position.

This position list is split into two pieces. The top portion of the screen contains the list of positions established throughout the system. When a position is clicked or selected, the trades that are associated with this position are shown in the trade list below.

Position List Columns

Symbol	The tradable symbol name.
Type	The position type taken, long or short.
Shares	The maximum number of shares or contracts held throughout the lifetime of this position.
Open Date	The date the first trade was made for this position.
Close Date	The date the position was completely liquidated.
Avg Entry	The weighted average of opening trades in this position
Avg Exit	The weighted average price that the shares or contracts were closed/covered at.
Bars Held	The number of periods the position was open.
P/L Bar	The average amount gained or lost on a per bar basis.
P/L	The total amount gained or lost throughout

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	the life of the position.
Description	The user assigned name of this position.

Trade List

The trade list contains the complete list of every trade generated by the simulation.

Trade List Columns

Symbol	The tradable symbol name.
Type	The type of transaction, either buy, short, sell or cover.
Transaction Date	The date the trade was placed.
Shares	Number of shares or contracts that were filled in this transaction.
Price	The fill price of the trade.
Commission	The cost of commissions for this trade.
Amount	The amount of capital added or deducted from the account for this trade.
Description	The user assigned name given to this trade.
Cash	The amount of cash available in the account after this transaction was completed.

Symbol Results

The symbol results tab contains an aggregated list of the trades. The trades are aggregated by symbol. This provides a way to quickly determine which symbols are performing and which are not.

Symbol Results Columns

Symbol	The tradable symbol name.
Profit	The amount gained or lost for this symbol.
Profit per Bar	The amount gained or lost averaged over the number of bars held.
Trades	Total number of trades entered with this symbol.
Winners	The number of trades with a profit greater than 0.
Losers	The number of trades with a profit less than or equal to 0.
Winning %	The number of winning trades divided by the number of losing trades.

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Avg Bars Held	The average number of periods each position was open.

Scan

The scan tab is useful for determining the next action that the simulation would take. For example, if the system trades daily bars, the scan would show the next day's actions to be taken such as opening a new position or closing an existing position. Theoretically, a daily, weekly or monthly time frame trader can use the results from the scan and generate orders manually.

Scan Columns

Date	The date that the action should occur.
Order Type	The type of order to be submitted to the broker. This could be any number of the order types supported by RightEdge.
Symbol	The tradable symbol name.
Order Price	If this is a limit order, the price of the limit order will be specified here.
Winners	The number of trades with a profit greater than 0.
Losers	The number of trades with a profit less than or equal to 0.
Winning %	The number of winning trades divided by the number of losing trades.

Charts

While the grid based system results are opened after every simulation, the chart tabs can have any number of charts pull up. There are a number of potential chart tabs and the default chart tabs are configurable under the Options dialog.

RightEdge ships with five charts.

- **Profit Distribution**
  The Profit Distribution chart breaks down the profit and loss values into scaled values. A sample profit distribution chart is shown below.

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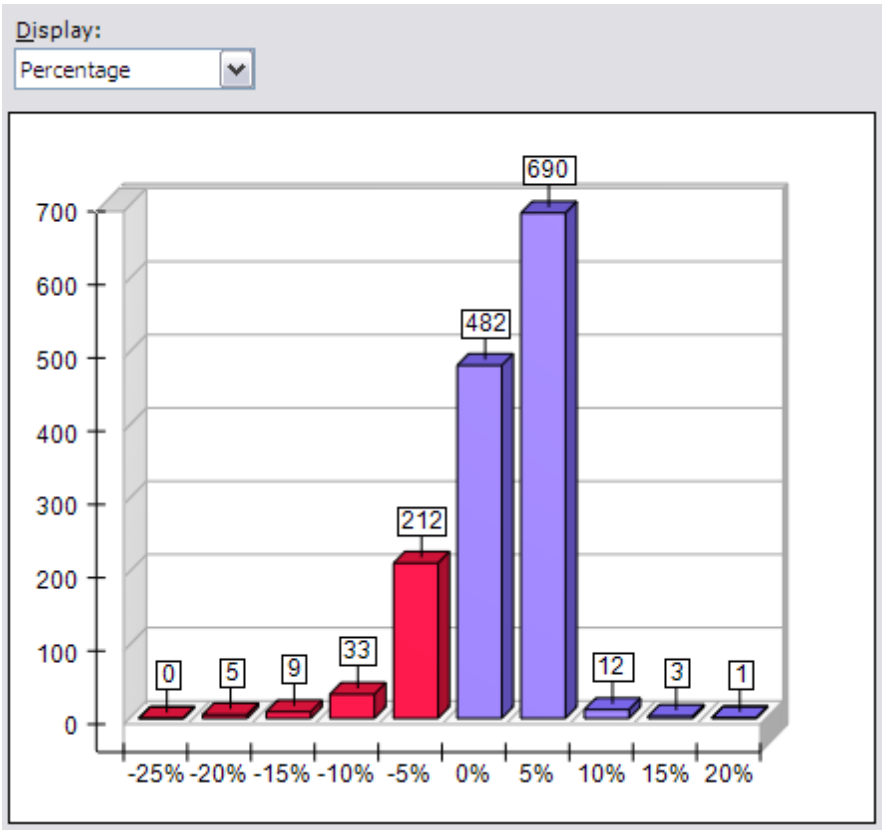

Use the ***Display*** dropdown to toggle between representing the chart in profit and loss percentages and currency.

- **System Breakdown**
  The system breakdown chart is a bit unique in that it is a hybrid of text and graphics. It also has some interactivity features where you can select the aggregation level of weekly, monthly or yearly. The results are calculated in real time and the chart and results areas are updated. An example of the system breakdown chart is below.

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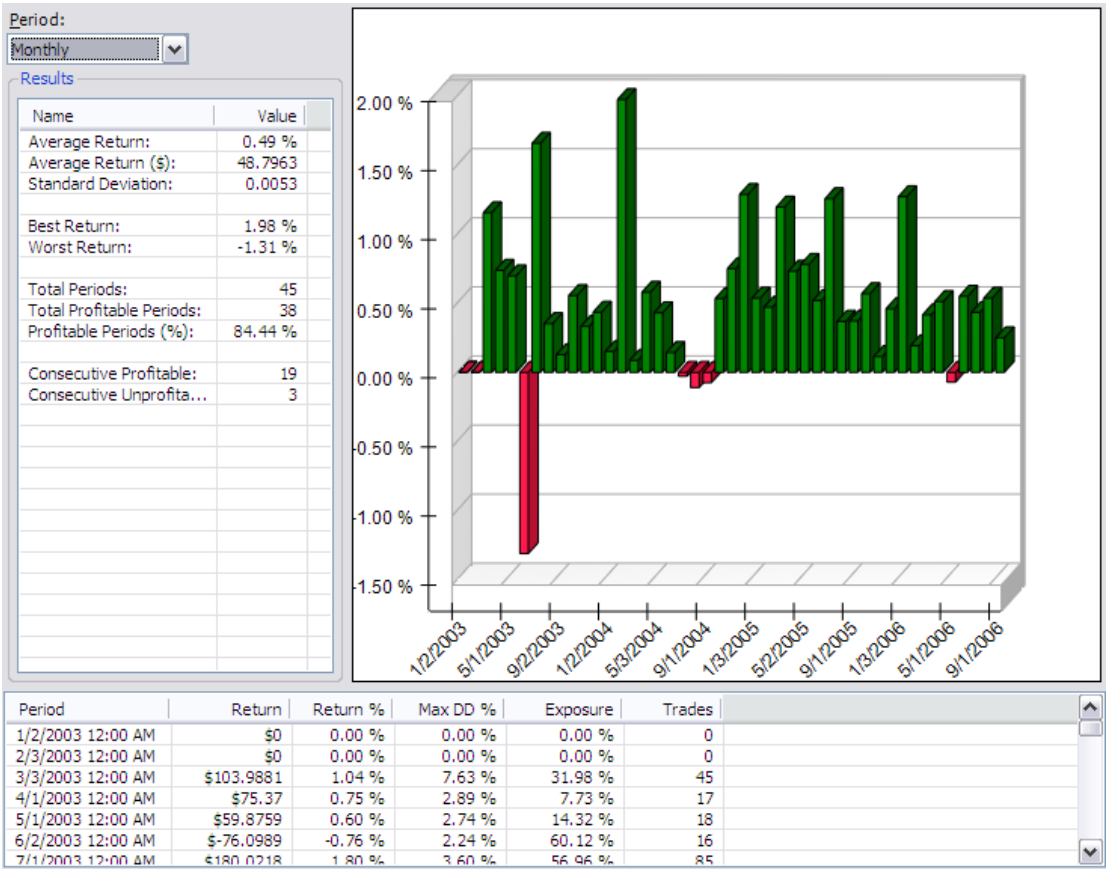

- **Equity Curve**
  The equity curve chart represents the cash and asset value at each point during simulation. This is a visual way of assessing drawdown and exposure. The Buy and Hold account value is represent as a line displayed over the cash and asset value stacked series.

- **MAE / MFE**
  This chart is similar in look and feel to the profit distribution chart, however, this chart breaks out the MAE and MFE calculations on a percentage or currency basis. The chart is broken into two pieces. The MAE is displayed on the top half of the chart and the MFE is displayed on the bottom half.

- **Symbol Breakdown**
  The symbol breakdown chart is a simple pie chart that displays all symbols that took trades during the simulation period. This is chart allows a quick and easy way to visualize which symbols are taking trades and which symbols are not. This can help identify and prune "dead" symbols.

See Also

General Options

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7 Technical Indicator List

RightEdge ships with a robust set of technical indicators out of the box. The RightEdge developers assembled the most commonly used indicators so that a system developer can be productive quickly. Below is a list of technical indicators that have shipped with the product. Click on the indicator name to receive an overview of the indicator. Each overview also contains sample code to use the indicator in a trading system.

- Accumulation/Distribution
- Accumulation Swing Index
- Add Series
- ADX
- ADXR
- Aroon Down
- Aroon Oscillator
- Aroon Up
- Average Price
- Average True Range (ATR)
- Balance of Power
- Bollinger Band (Lower)
- Bollinger Band (Upper)
- Center of Gravity Oscillator
- Chaikin Money Flow
- Chaikin Oscillator
- Chaikin's Volatility
- Chande Momentum
- Commodity Channel Index
- Commodity Selection Index
- Constant
- Detrended Price Oscillator (DPO)
- DI Minus (DI-)
- DI Plus (DI+)
- Divide Series
- Donchian Channel (Lower)
- Donchian Channel (Upper)
- Double Exponential Moving Average
- DX
- Dynamic Momentum Index
- Ease of Movement
- Exponential Moving Average (EMA)
- Envelope (Lower)
- Envelope (Upper)
- Forecast Oscillator
- Historical Volatility
- Intraday Momentum Index (IMI)
- Keltner (Lower)
- Keltner (Upper)
- Klinger Oscillator
- Linear Regression Indicator

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- Linear Regression Slope
- Linear Regression Trendline
- MACD
- Market Facilitation Index
- Mass Index
- Median Price
- Momentum
- Money Flow Index
- Multiply Series
- Negative Volume Index
- On Balance Volume
- Parabolic SAR
- Performance
- Positive Volume Index
- Price and Volume Trend
- Price Channel (Lower)
- Price Channel (Upper)
- Price Oscillator
- Price Rate-of-Change
- Projection Bands Lower (Widner)
- Projection Bands Upper (Widner)
- Projection Oscillator (Widner)
- Qstick
- R-Squared
- Range Indicator
- Relative Momentum Index
- Relative Strength Index (RSI)
- Relative Vigor Index
- Relative Volatility Index
- Shift Series
- Simple Moving Average (SMA)
- Standard Deviation
- Standard Deviation (Lower)
- Standard Deviation (Upper)
- Standard Error
- Standard Error Band (Lower)
- Standard Error Band (Upper)
- Standard Error Channel (Lower)
- Standard Error Channel (Upper)
- Stochastic Momentum Index
- Stochastics (Fast)
- Stochastics (Slow)
- Stochastics RSI (StochRSI)
- Subtract Series
- Swing Index
- Time Series Forecast
- Tirone Level (Lower)
- Tirone Level (Upper)

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- Triangular Moving Average
- Triple Exponential Moving Average
- TRIX
- True Range
- Ultimate Oscillator
- Variable Moving Average (VIDYA)
- Vertical Horizontal Filter (VHF)
- Volume Adjusted Moving Average
- Volume Oscillator
- Volume Rate-of-Change
- Weighted Close
- Weighted Moving Average
- Wilders Smoothing
- Williams Accumulation Distribution
- Williams %R
- ZigZag

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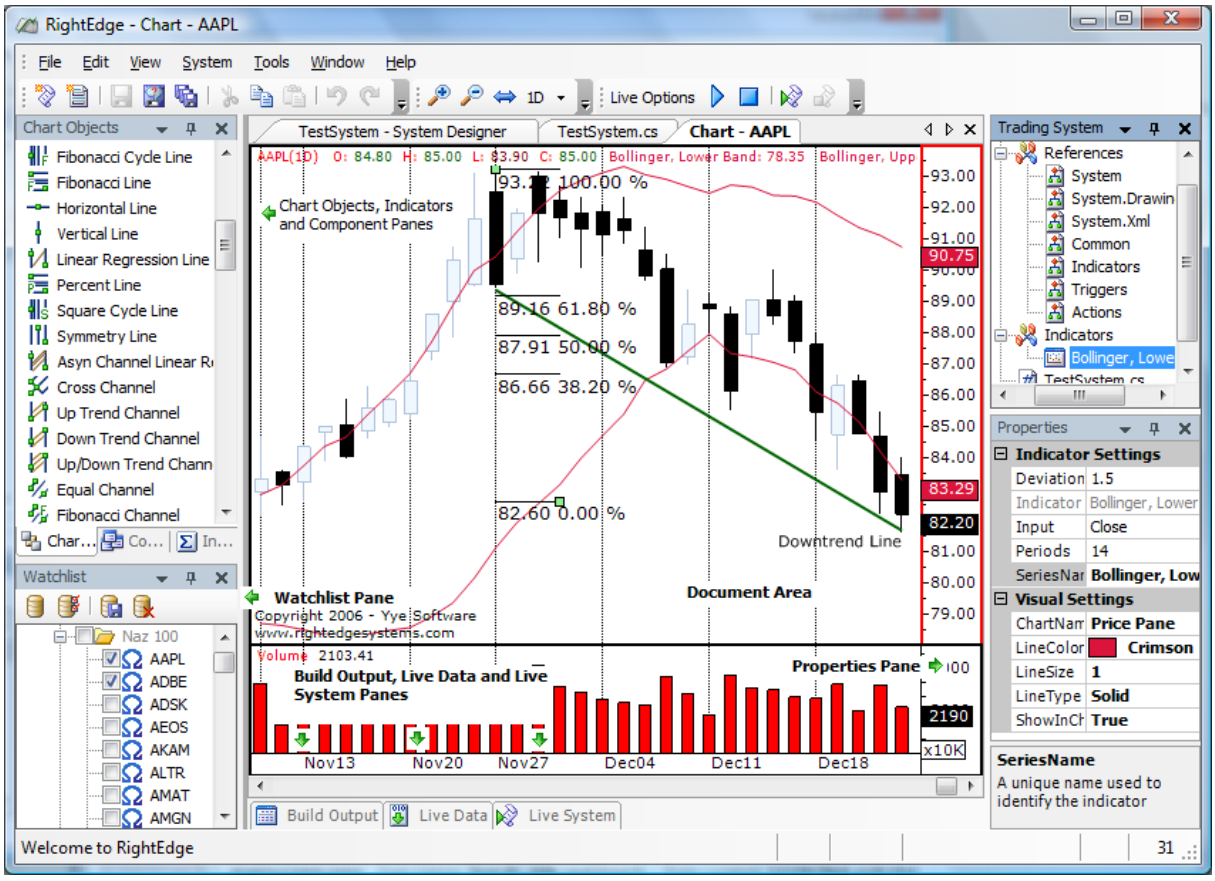
8 RightEdge Environment

8.1 Using the RightEdge Environment

RightEdge uses cutting edge user interface components so that relevant information is available at all times. The RightEdge environment consists of dockable windows, floating windows, dockable menus and toolbars and a document manager with "tear-away" tabs. There are many aspects about the user interface that are customizable. First, let's get acquainted with the panes that are available.



The illustration above shows all of the panes available in RightEdge. The most important area of the application is the ***Document Area***. The document area houses a variety of documents that can be called up in RightEdge. In the above example, a chart current exists in the document area. Other items that are considered documents are source code files, the Project form (used in drag and drop system building) and the System Results document.

Hiding/Pinning and Unhiding/Unpinning Panes

Each pane in RightEdge can be hidden or shown at any time.

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The example above shows all of the panes in RightEdge hidden with the exception of the Properties pane which has "flown out". The pin in the upper right hand corner, when pressed, will make the pane a part of the current window. When unpinned, the pane will disappear to the nearest edge of the main window. When the mouse is rolled over the pane title, the pane will "fly out" where it can be pinned again. If unpinned and the mouse leaves the pane area, the pane will hide itself again.

Docking Panes

Each pane in RightEdge can be hidden or shown at any time. In addition this a pane can be docked inside of another pane or to the top, bottom, left or right of the edge of the main window.

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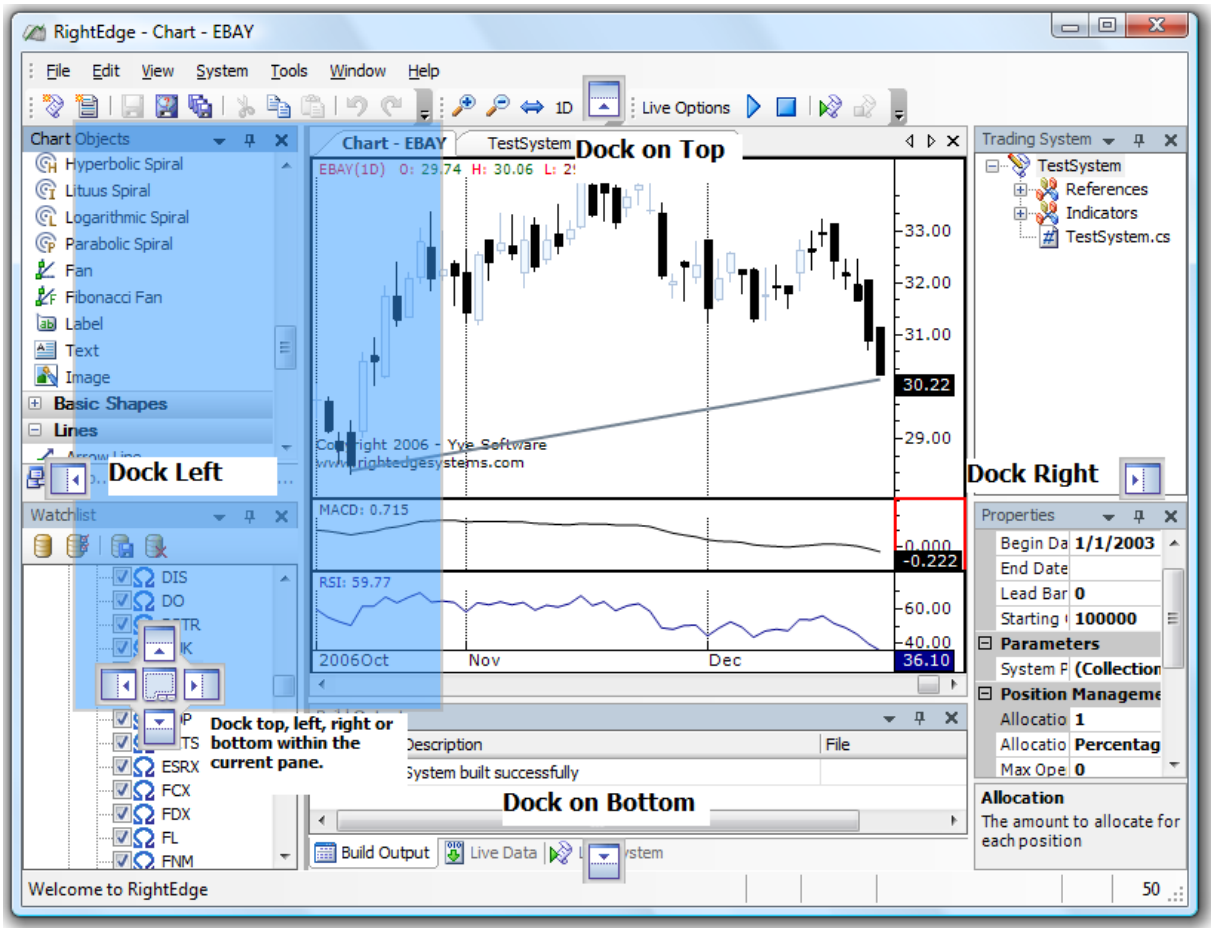

Use the left mouse button and click and hold the tab area of the pane. When a drag on the tab occurs, the pane will become transparent and docking arrows will be displayed as shown above. Move the mouse cursor on top of any of these arrows to perform the dock operation. Hit the Escape key to cancel the drag operation. To undock a pane and specify that it should not be docked with any other, hold the Control key before beginning the drag operation.

Document Area

As mentioned previously, the document area will contain document like items such as charts and source files. Documents cannot be docked within other panes, however, documents can be split within the document area or "float". Click the tab area of the document with the left mouse button and begin to drag the tab.

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The sample above shows two charts that are stacked horizontally along with another chart that is floating outside of the main RightEdge window.

Floating documents are particularly useful in a both a chart or source file situation, especially in a multiple monitor environment.

Note: Pane layout is persisted between instances of RightEdge. Documents are not persisted between instances.

See Also

Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Live Data Pane
Live System Pane
Chart Objects Pane
Build Output Pane

8.2 Automating RightEdge

RightEdge can perform high level tasks by specifying certain parameters on the command line. The following tasks can be performed on startup.

- Open a RightEdge Project file (.rep)
- Update historical data for a particular Watchlist folder
- Start a live system.

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- Start collecting live data.
- Run a simulation.

The command line options to perform these tasks are listed below. You can always run RightEdge from the command line with a '/?' parameter to see a summary of the commands as well as a description.

Usage:

RightEdge.exe /W:"Watchlist Folder Name" [/P:"Project File"] [/L] [/S] [/U] [/E] [/O:"Optimization Inputs File"]

/W:	Specifies the Watchlist Folder. This is a required parameter.
/P:	Project File. Specifies the .rep to load when running a live system or simulation.
/L	Executes a live system using the specified project. This may not be used with /S.
/U	Will perform a historical data update on the Watchlist folder name specified.
/S	Executes a simulation on the specified watchlist folder using the specified project.
/D	Start live data collection. Note: This is started automatically if running a live system.
/E	Shut RightEdge down upon task completion.
/O:	Specifies an unattended optimization run using the specified file. (see below for input file format)

Additional notes on command line switches

Optional parameters are in brackets.

Items shown in quotes should contain quotes to ensure that spaces contained the within the parameters are properly accounted for.

If a live system or simulation is not specified and a project file is specified. The project file will open. However, a project file is absolutely required if a simulation or live system run is specified.

A project file (.rep) can be specified all by itself on the command with no switches. RightEdge will start up and simply open this trading system project file.

If running an optimization, the optimization inputs are required on the command line using the /O: option. The list of parameters can be comma or tab separated but must be in the following order:

Parameter Name, Low, High, Number of Steps.

For example, to specify the optimization inputs for a system that has an optimization parameter named "MyOptVar", the file would look like this:

MyOptVar,10,100,10

This would specify that the optimization value starts at 10 and ends at 100 with a step increment of 10.

Order of Operation Evaluation

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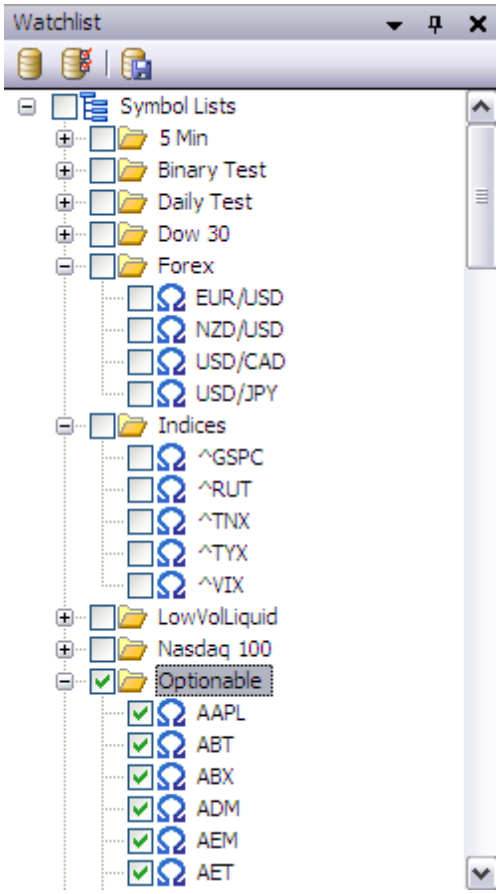
- Project file is opened
- Watchlist folder is selected
- Historical data is updated
- Either a simulation or a live system is run.

8.3 Watchlist Pane

- Manipulating and Using Watchlists
- Updating Watchlist Data

The Watchlist pane is arguably the most important pane in RightEdge. This pane is the central point for collecting historical and live data, backtesting, and starting live systems. The Watchlist groups items together in logical forms as dictated by the user.



RightEdge ships with a couple of watchlist folders defined. The example above shows the power and intuitiveness of the watchlist as the number of symbols increases and the number of trading vehicles increases. Shown above is a collection of indexes, stocks, and forex folders. Some are real time, some are historical.

Manipulating and Using Watchlists

A folder is created by right clicking any other folder or the top level node in the watchlist.

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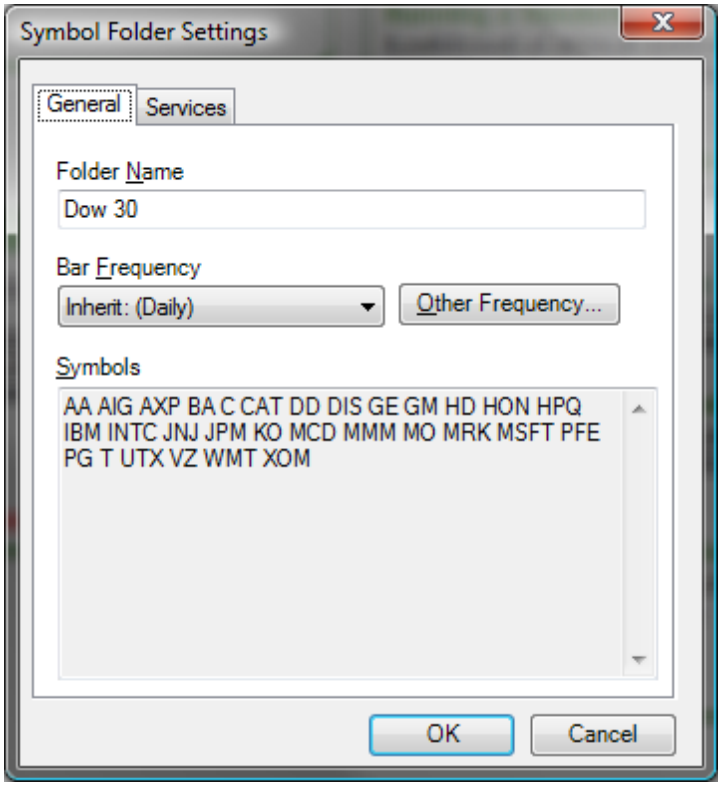
Select ***New Folder*** to begin the process and type the desired folder name. Folders can contain any number of folders and a folder can contain any number of symbols. The checkboxes next to each symbol indicate that any action requested will be performed on the selected symbols. For example, to run a simulation on the Nasdaq 100, click the checkbox next to the Nasdaq 100 folder. This will check all symbol items underneath the folder. Individual symbols can be toggled as well. When starting a live system, the selected symbols are loaded into the live data pane and the live system will load these symbols into memory for processing.

To add symbols to the newly created folder, right click on the folder and select ***Configure Folder***.



Symbols are added and removed from the ***Symbols*** box. Please see the Symbol Folder Settings topic for detailed information.

When OK is clicked, the symbol items will be added underneath the folder in the watchlist.

Right clicking on a symbol displays a different set of options.

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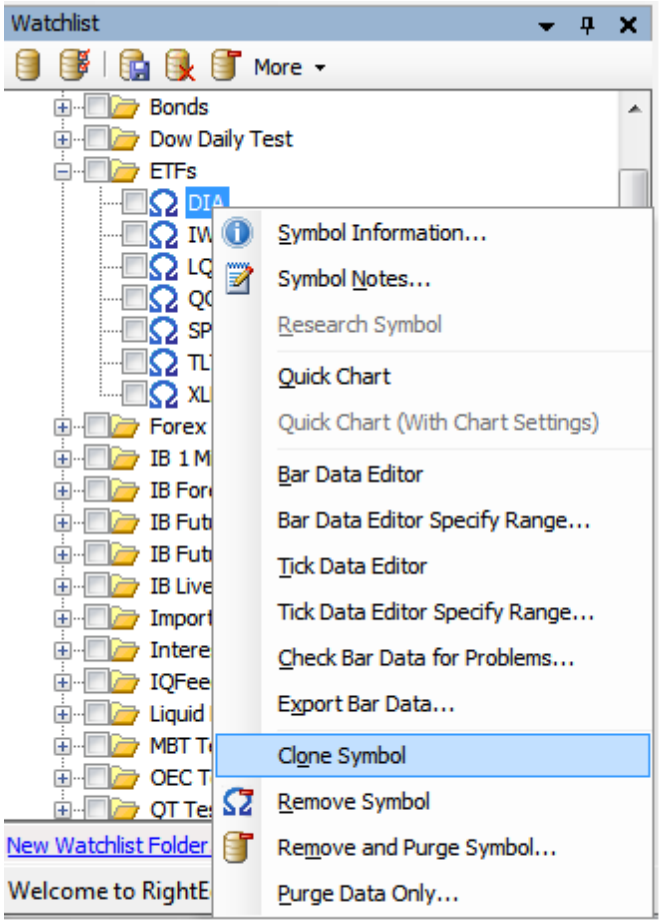

Symbol Information Displays the Symbol Information dialog to configure the individual symbol.

Symbol Notes Allows for free form text notes to be associated with this symbol.

Research Symbol This menu is available based on items configured in the Research tab under Options. It allows research to be performed using external resources specific to this symbol.

Quick Chart This option will display a vanilla price and volume chart in the document area for the selected symbol.

Quick Chart (With Chart Settings) This option is populated when there are previously saved charts available. See Saved Charts for more information.

Bar Data Editor Displays the bar data editor for access to the raw price values stored for this symbol. See the Bar Data Editor section for more information.

Tick Data Editor Displays the tick data editor for access to the raw tick values stored for this symbol.

Tick Data Editor Specify Range Displays the tick data editor for the specified date range. This is useful when the store contains a significant amount of data and loading all

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of it is not feasible.

Check Bar Data For Problems Runs a series of checks on bar data to find duplicate bars, bars out of sequence, data range issues and more.

Export Bar Data Facilitates exporting the raw price and volume data into a text file.

Clone Symbol Creates a copy of the selected symbol complete with all settings.

Remove Symbol Deletes the selected symbol from this folder. Symbol items can also be deleted under the General tab of the Symbol Folder Settings.

Updating Watchlist Data

In the case of historical data, the Watchlist can control data updates. For instance, if a watchlist for the Nasdaq 100 was created with a frequency of Daily, at the end of the day it would be necessary to update the data in this folder manually. To do so, use the toolbar located at the top of the Watchlist.

The first button will update all historical data for all symbols indiscriminately. The second button will update the symbols that are checked. The third button will export the raw data for the selected symbols. Data is exported in a tab delimited format in the following order:

Symbol Date Open Close High Low Volume Open Interest

See Also

Using the RightEdge Environment
Trading System Pane
Indicator Pane
System Components Pane
Chart Objects Pane
Live Data Pane
Live System Pane
Build Output Pane

8.4 Trading System Pane

The Trading System pane contains an open trading system project. RightEdge can do some basic things functions such as collect historical, display charts and indicators, but a trading system is what truly exposes the power in RightEdge. There are two ways to begin working with a trading system. To create a new trading system select ***New*** from the ***File*** menu and click the ***Trading System...*** menu item. See the New Trading System topic for more information about the fields in this dialog. The second option is to open an existing trading system. Select ***Open Trading System*** from the ***File*** menu and select a RightEdge project file.

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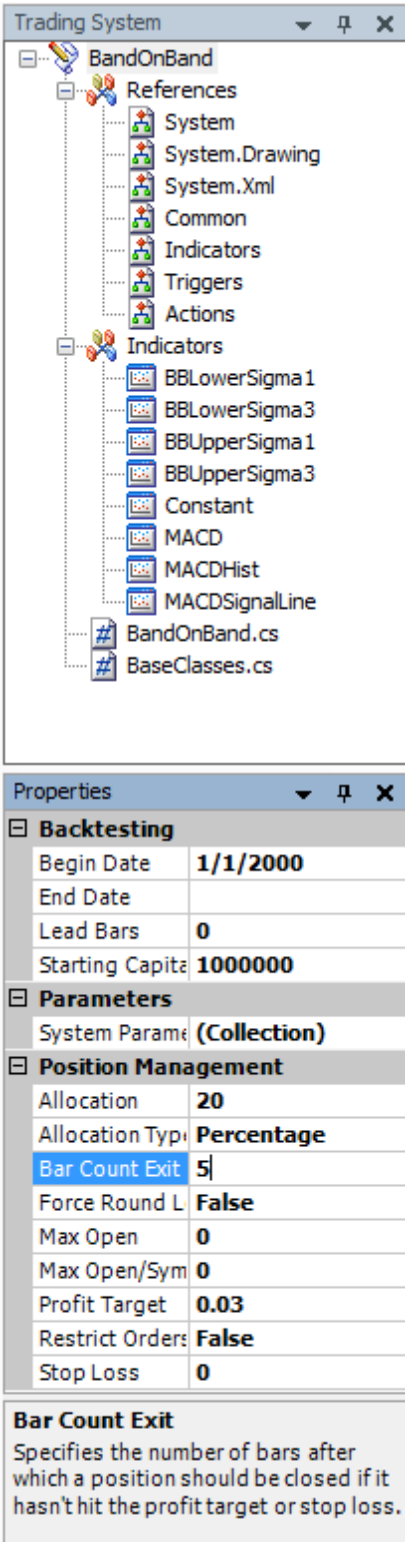
Note: RightEdge project files have a .rep file extension.

Once a trading system is opened, the trading system pane is populated as shown below.



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Working With an Open Trading System

When the Project node (the topmost level tree item) is selected, project properties are displayed in the properties pane. The properties grid contains all of the project properties. See the Trading System Properties and Project Properties dialog for further information.

The References node contains all of the external assemblies that are referenced in this project.

The Indicators node contains all of the indicators that are associated with the project. Indicator items can be dragged from the Indicator Pane and dropped onto the Indicators node. When indicators are selected on this node, properties for the indicators are displayed in the Properties pane.

The remaining items in the project are the files used to build the trading system. In the case of drag and drop systems or a trading system that has been previously exported, there may be nothing of consequence here. When source files do exist, double click on the file to open the file. It will be displayed in the document area.

Each item in the project tree contains a context menu. For example, right clicking on a source file gives relevant options such as ***Copy***, ***Delete***, ***Rename***, etc. References and Indicators are only given the ***Remove*** option which removes them from the project (and does not permanently delete them).

Running the Trading System

Once a trading system is created or opened, an additional menu is created within RightEdge. This top level menu item is titled "Build".

Compile If the project contains source files, this will invoke the appropriate compiler to find and report any source code errors. The compilation status is reported in the Build Output Pane.

Run Backtest This will compile the trading system and run a backtest or simulation with the currently selected symbols.

Run Live This will compile the trading system and begin running it against live data. If live data is not started, it will be started automatically.

Stop Live This item is enabled when a system is running live. This will stop the system and live data.

See Also

Using the RightEdge Environment
Trading System Properties
Project Properties
Watchlist Pane
System Components Pane
Live Data Pane
Live System Pane
Chart Objects Pane

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8.4.1 Trading System Properties

Trading system properties are values that can be manipulated in the user interface before a system run. Some of these values will also dictate defaults for frequent actions such as opening a position, settings a stop loss, etc. These items are global in nature, meaning that they are not symbol specific. If any of these settings need to be symbol specific, it is recommended that the global option is disabled and that symbol specific handling is done in code. For example, if symbol specific risk management or funds allocation is desired, these are dynamic cases that should be handled in the system code itself. For more information about handling position management manually, see the *Order Management* heading under the Developing Trading Systems in RightEdge topic.

Lead Bars This is the number of bars to skip before the system begins taking trades. A setting of 0 means trades are accepted immediately. This setting can be greater than 0 if there are indicators or other items that require a certain number of bars before they can be calculated.

Data Start Date The date that historical data will start being fed to the trading system. By default (empty data start date), the first bar encountered in the data store is when the data begins being fed to the trading system.

Trade Start Date The first date when trades will be accepted. By default (empty trade start date), the first date of data is also the first date trades will be accepted.

Simulation End Date A forced stop date of the simulation. If more data exists, it will not be fed to the simulation loop.

Starting Capital The initial amount of capital dedicated to the system.

Live Lead Bars The number of bars to skip before trades will be accepted when the system is running live. This setting is ignored in simulation.

Live Data Date The start date that historical data will be loaded in a live trading system.

Frequency The frequency of this trading system. The default setting, Automatic, will detect the frequency based on the data loaded. To override this, select a different frequency from the list. For more information about configuring frequencies, please see the Managing Frequencies topic.

Tick-level Simulation Indicates whether or not to use tick data if the data is available. If this data is available and this option is enabled, trading systems will receive NewTick notifications in simulations. Live systems always receive tick notifications when hooked up to a live data source.

Note: If enabled, this may increase load time and slow down the overall simulation.

Synchronize Bars Indicates whether or not bars are kept in sync across symbols. For example, if symbol XXX trades on 1/3/2009 and symbol YYY does not, an empty bar is inserted for symbol YYY so that the historical data lists are kept in sync. If this is disabled, there would be no bar for YYY on that trade date.

Allocation Amount of capital put towards newly created positions.

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Allocation Type

Percentage
Allocates a percentage of the total portfolio for every position opened. For example, if the system has a starting capital of $100,000 and the percentage is set to 10%, the first open position would allocated $1,000. As the account value grows or shrinks, the percentage allocated to each position would also grow or shrink.

Fixed Value
Allocates a fixed amount to each position regardless of account size. For example, if system has a starting capital amount of $100,000 and a fixed size of $50,000 per position, the system could only have 2 open positions with an account size of $100,000. If this dips below $50,000, the system will stop taking trades.

Fixed Size
Allocates a fixed unit size per position. In the case of stocks, a fixed number of shares would be used per position (assuming the required capital is available). In futures and options, a fixed number of contracts.

Allocation Amount of capital put towards newly created positions.

Bar Count Exit Specifies the number of bars after which a position should be closed if it hasn't already been closed by another order. By default, this is 0, which means that a position will never be closed after a particular number of bars have elapsed.

Force Round Lots This property will tell the system to only submit orders using round lots (i.e. a share count rounded to the nearest 100).

Max Open & Max Open Per Symbol The number of total number of open positions and/ or the number of open positions per symbol.

For example, if the Max Open value was set to 3 and the Max Open Per Symbol was set to 1 and we had the following situation:

2 open positions, 1 for symbol YY and another for symbol XX. If a buy signal occurred for YY, the trade would be declined because we already have our maximum number of open positions per symbol. If on the other hand, a signal was generated for symbol ZZ, the trade would be accepted. However, we have now hit our maximum limit for Maximum Open, so all further trades would be declined until any of the open positions were closed.

Profit Target An automatic, global profit target value assigned to newly created positions. This can be overridden in code, but by default, this profit target value will be applied to positions. Valid values are:

Relative Ratio This setting will take the value placed in the Profit Target setting and multiply the asset's current price. For example, to set a relative profit target of 5%, the PT value must be 0.05.

Relative Price This setting will take the value placed in the Profit Target setting and add (for a short) or subtract (in the case of a long) it the asset's current price. For example, to set a profit target that is $1 above the current price, the PT value would be 1.

Relative Ticks This setting will take the value placed in the Profit Target setting and add

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(for a short) or subtract (in the case of a long) the specified number of ticks when setting the profit target. This is particularly useful for futures or other leveraged instruments where a profit target represented as a percentage or price does not make sense.

None Automatic profit target orders are turned off.

Stop Loss An automatic, stop loss value assigned to newly created positions. This can be overridden in code, by default, this stop loss value will be applied to positions. Valid values are Relative Ratio, Relative Price, Relative Ticks and None. See above for detailed descriptions of what these settings mean.

Restrict Orders Sent This property specifies whether the "maximum open positions" settings should limit the number of position open orders submitted. For example, if there is a maximum open position setting of two and there is one open position and an additional limit order submitted, if the restrict setting is set to true, any subsequent orders will be rejected until the limit order is cleared. If it is set to false, open orders are ignored in the count and only truly open positions are counted.

System / Optimization Parameters System parameters can be set inline. Click the *Add System Parameter* link to add a new system parameter. The parameter is created inline where it can be named and the default, high and low values can be assigned. Steps indicates the increment value. For example, with a low value of 1, a high value of 10 and a step parameter of 1, this would indicate that by itself, this optimization parameter would create 10 iterations. See the Optimization Overview topic for a complete overview.

See Also

Developing Trading Systems in RightEdge
Managing Frequencies
Optimization Overview
Optimization Parameters
***

8.5 Indicators Pane

The indicator pane (shown below) contains all of the technical indicators that are available in RightEdge.

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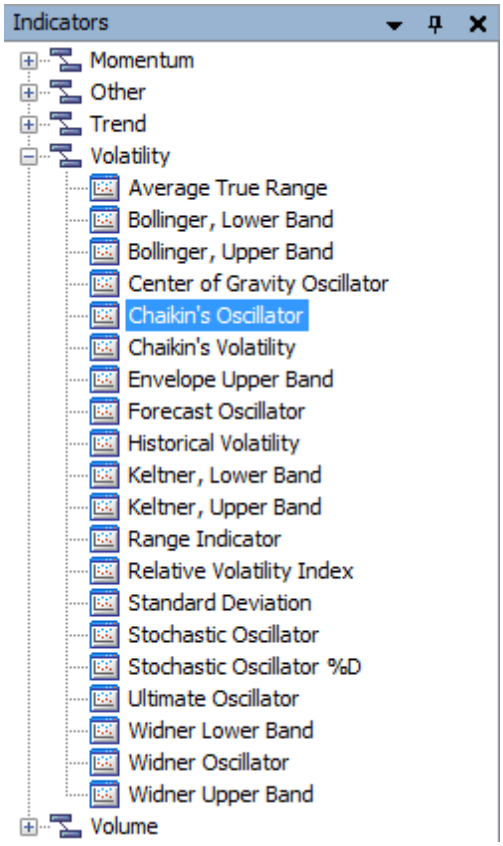

The indicators are broken down by groups. The default groups are Momentum, Trend, Volatility, Volume and Other. The ***Other*** group is a catch all that contains indicators such as Add, Subtract, Divide and Shift. While not actually indicators, these simple operations are commonly performed on true indicators.

The indicator pane serves as the master list of indicators. Indicator items in this list can be moved or assigned to different areas of the program. For example, if a chart is displayed in the document area, indicators can be dragged and dropped onto the chart. When an indicator is dropped onto the chart, a dialog is displayed prompting for the parameters for the indicator as well as visual settings. The example shown below is the result of a lower Bollinger Band indicator being dropped onto a chart.

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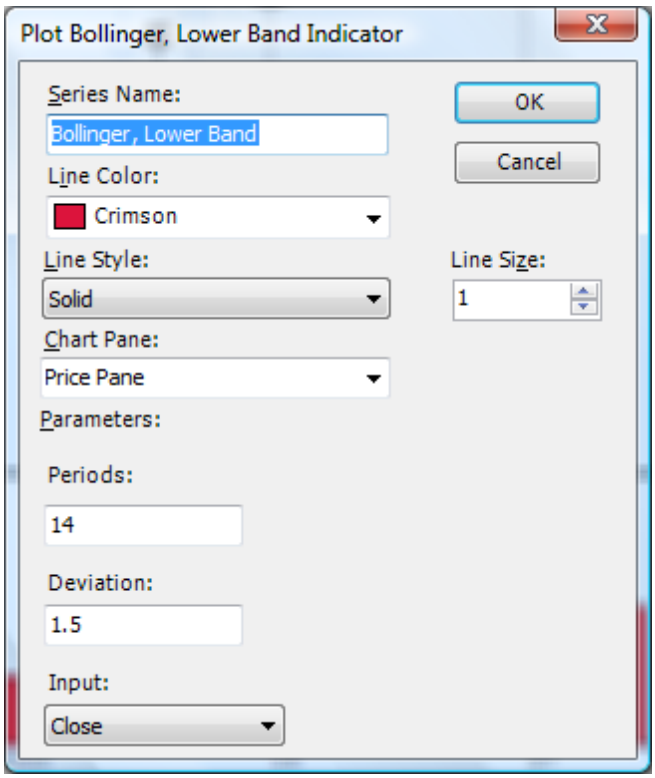

Please see Indicator Parameters for further details about this dialog.

Once an indicator is dropped onto the chart, the indicator and visual settings can be manipulated in real time using the Properties pane.

Indicator Plugins

RightEdge supports the use of indicator plugins written by third parties. You may even create your own indicator plugin. The plugin will be displayed in the list along with native RightEdge indicators.

Consult the RightEdge Developer's Guide for additional information regarding development of third party indicator plugins.

Finally, once indicators are placed on the chart and the desired parameters are set, charts can be saved with the indicators configured so that they may be restored at a later time. See the Saving Charts topic for more information.

See Also

Using the RightEdge Environment
Trading System Pane
Watchlist Pane
System Components Pane
Chart Objects Pane
Live Data Pane
Live System Pane

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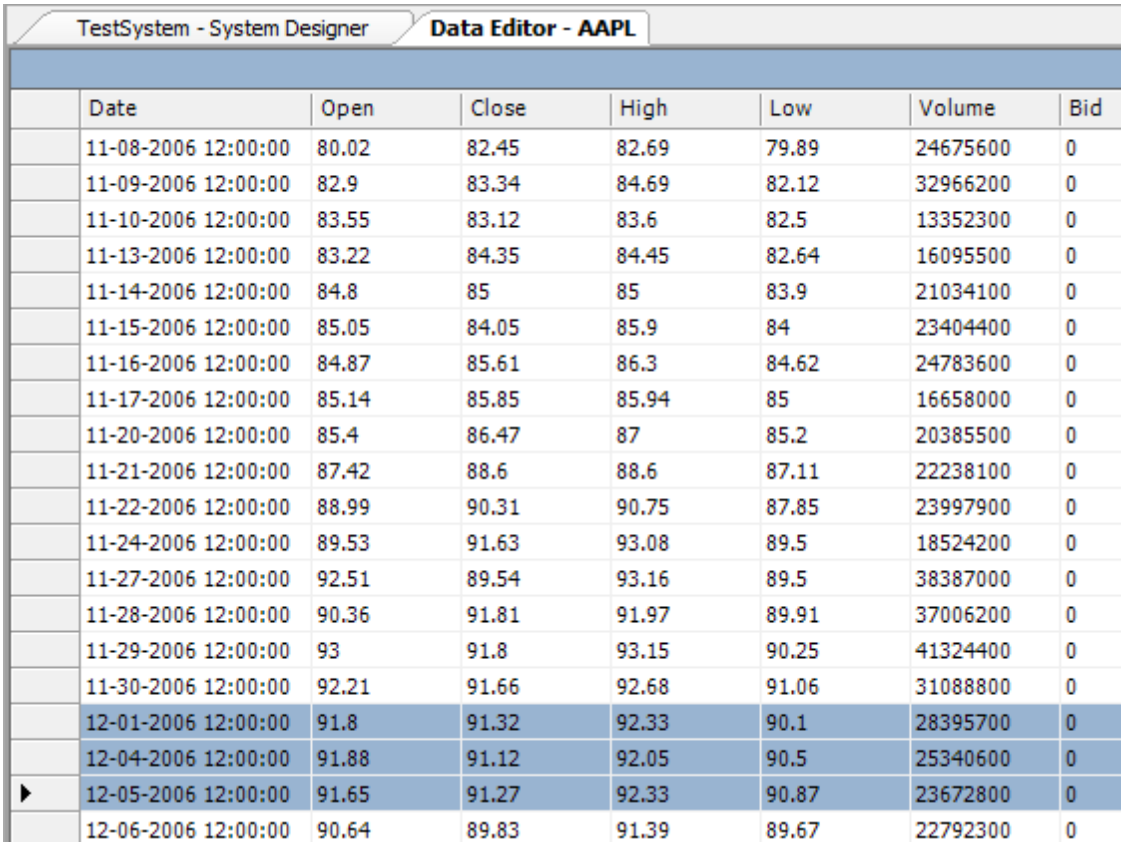
Build Output Pane

8.6 Bar Data Editor

The Bar Data Editor allows direct modification of the underlying symbol data. This editor is used when the price data needs to be modified manually for any number of reasons such as a stock split or data that was downloaded and was erroneous from the provider and must be corrected.



Date	Open	Close	High	Low	Volume	Bid
11-08-2006 12:00:00	80.02	82.45	82.69	79.89	24675600	0
11-09-2006 12:00:00	82.9	83.34	84.69	82.12	32966200	0
11-10-2006 12:00:00	83.55	83.12	83.6	82.5	13352300	0
11-13-2006 12:00:00	83.22	84.35	84.45	82.64	16095500	0
11-14-2006 12:00:00	84.8	85	85	83.9	21034100	0
11-15-2006 12:00:00	85.05	84.05	85.9	84	23404400	0
11-16-2006 12:00:00	84.87	85.61	86.3	84.62	24783600	0
11-17-2006 12:00:00	85.14	85.85	85.94	85	16658000	0
11-20-2006 12:00:00	85.4	86.47	87	85.2	20385500	0
11-21-2006 12:00:00	87.42	88.6	88.6	87.11	22238100	0
11-22-2006 12:00:00	88.99	90.31	90.75	87.85	23997900	0
11-24-2006 12:00:00	89.53	91.63	93.08	89.5	18524200	0
11-27-2006 12:00:00	92.51	89.54	93.16	89.5	38387000	0
11-28-2006 12:00:00	90.36	91.81	91.97	89.91	37006200	0
11-29-2006 12:00:00	93	91.8	93.15	90.25	41324400	0
11-30-2006 12:00:00	92.21	91.66	92.68	91.06	31088800	0
12-01-2006 12:00:00	91.8	91.32	92.33	90.1	28395700	0
12-04-2006 12:00:00	91.88	91.12	92.05	90.5	25340600	0
12-05-2006 12:00:00	91.65	91.27	92.33	90.87	23672800	0
12-06-2006 12:00:00	90.64	89.83	91.39	89.67	22792300	0

This screen is displayed by right clicking on a symbol in the Watchlist pane. The data appears in the document area. The sample above shows the bar data displayed in a grid. The items in the grid can be sorted by clicking the heading portion of the grid. Dates are entered in a free form manner and are sensitive to locales.

Modifying Bar Data

A ***Bar*** menu is added to the main window when the bar data editor is active. The same menu may also be displayed by right clicking on the bar data editor itself.

Add Bar Adds a new row to the bottom of the grid. Fill in the values to complete the addition of the new bar.

Remove Bar Removes the currently selected bar or bars.

Stock Split Displays the stock split dialog to split the prices. The split dialog will prompt

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for the split date and the split factor. For example, if IBM was scheduled to split 3 for 2 on January 1st, 2007, the split becomes effective that date. All data before the split date will have to be adjusted.

Export Bar Data This provides a way to export the data displayed in the grid. The data is exported into a tab delimited file using the filename specified.

The data is exported in the following order:

Date Open Close High Low Volume Bid Ask Open Interest

The data is always sorted by date regardless of the current sort in the bar data editor grid.

Using the Grid Control

The data above is displayed within a grid control. The grid control displays data in a series of rows and columns. The grid control contains two areas, a selection area and the display area. The selection shows which rows are currently selected and allows the selection to be changed. There are two ways to change the selection. The first way is by selecting a row and holding down the ***Shift*** key and using the up and down arrows to select rows above or below the current selection. The second way is by using the mouse to click and drag over the desired rows within the selection area of the grid.

Inserting items can also be accomplished by scrolling to the bottom of the grid and clicking the data area in the star (✳) row. When data editing begins, RightEdge will fill in all fields with default values.

Deleting one or more rows is accomplished by selecting the row or rows as outlined above and hitting the ***Delete*** key. The selected rows will be removed from the data.

Note: Data additions or removals are not committed to the data store until ***Save*** is selected.

Each of the columns in the grid can be sorted by clicking their corresponding header. For example, to sort the data in the grid by the opening price, click the column labeled Open. An arrow will be drawn within the header to indicate the direction of the current sort. Click the header again to invert the sort.

See Also

Indicator Pane
Watchlist Pane

8.7 System Components Pane

The System Components pane lists the triggers and actions that can be added to a trading system. To add a camponent, drag it from the System Components pane to the System Designer. See the Trading System Overview for more information.

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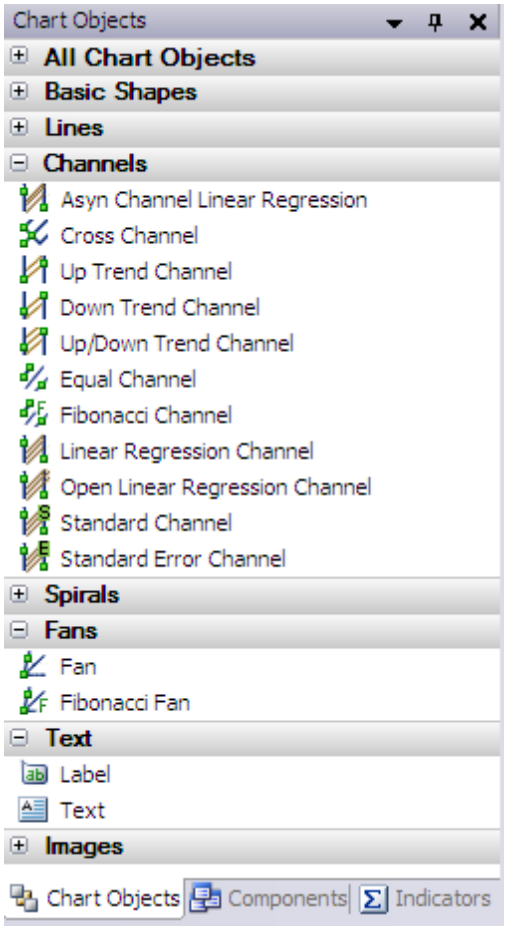
See Also

Using the RightEdge Environment
Trading System Overview
Trading System Pane
Watchlist Pane
Indicator Pane
Chart Objects Pane
Live Data Pane
Live System Pane
Build Output Pane

8.8 Chart Objects Pane

The chart objects pane (shown below) contains all of the chart objects that are available in RightEdge.



The chart objects are broken down by groups. The groups are Basic Shapes, Lines, Channels, Spirals, Fans, Text and images. If the break down is not required, the ***All Chart Objects*** heading displays the entire list without categorization.

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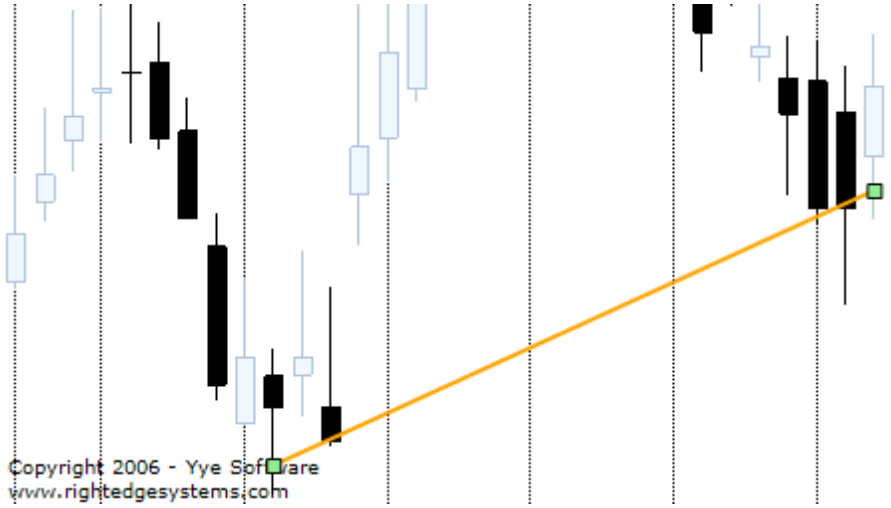
Like indicators, chart objects are dragged and dropped onto an open chart in the document area. Chart objects are different from indicators in that they are free form. To compare, an indicator can have different parameters changed and draw to reflect the new parameters. There is no additional control at that by the end user at that point. By contrast, chart objects can be manipulated once drawn on the chart.

Manipulating Chart Objects

If a line object is placed on the chart, the line points are determined by the end user and not any pre-defined algorithm. Once the initial line points are determined, they can be changed at any time by selecting the line object using the left mouse button. To select an object to move it, click anywhere inside the outer points of the object. Keep the mouse button down and drag the object to its desired location. To change the starting and ending points of the chart object, select the outermost areas of the object.

The illustration below shows a selected line object on a chart.



If either of the green squares are clicked, the object's size and points can be manipulated.

Visual properties of the chart object are dynamic in nature. Properties that apply to the selected chart object will be displayed in the Properties pane. Items such as size, color and drawing mode are common among all chart objects.

See Also

Using the RightEdge Environment
Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Live Data Pane
Live System Pane
Build Output Pane

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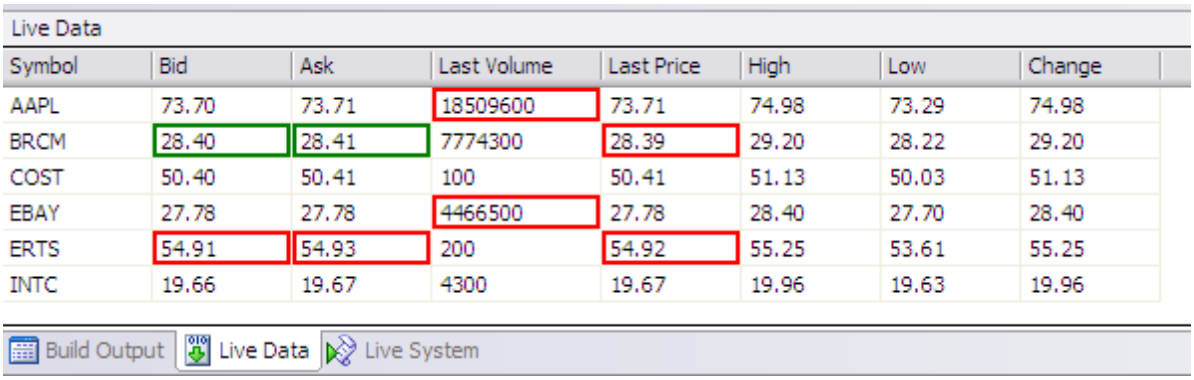
8.9 Live Data Pane

The live data pane is where incoming tick data can be viewed. Starting the data stream happens one of two ways. The first way is to start live data manually using the Start button on the live options toolbar. The second way is to start a live system. After the live system is loaded and the specified amount of historical data is loaded, the live system will automatically begin live data collection.

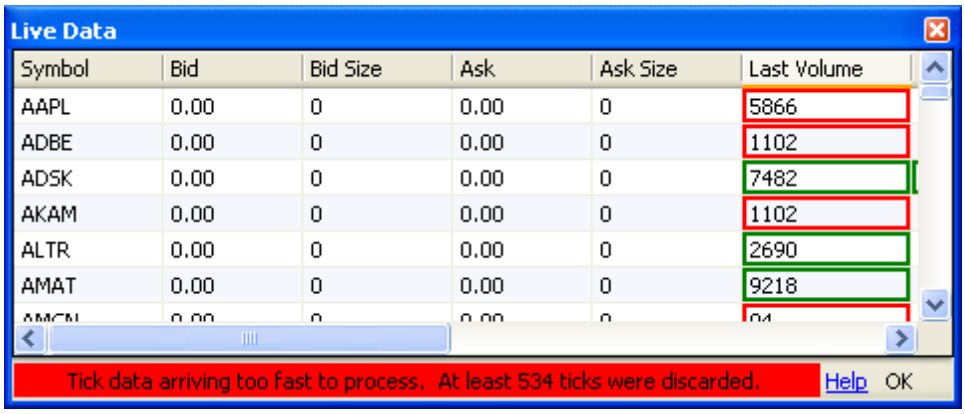


Once live data is started it can be stopped by the stop button on the live options toolbar or by stopping a currently running system.

Note: Open a live chart based on the collected data by double clicking any symbol in the live data list.

Discarding Live Data

Depending on the number of symbols for which you are capturing live data, whether you are saving tick data, and other factors (such as the speed of your computer), live data may arrive too fast to process. As this happens, the list of pending ticks will grow. Eventually, RightEdge will catch up by discarding all of the current pending ticks. A warning will show up at the bottom of the live data pane as shown below.


Live Data
Symbol Bid Bid Size Ask Ask Size Last Volume
AAPL 0.00 0 0.00 0 5866
ADBE 0.00 0 0.00 0 1102
ADSK 0.00 0 0.00 0 7482
AKAM 0.00 0 0.00 0 1102
ALTR 0.00 0 0.00 0 2690
AMAT 0.00 0 0.00 0 9218
Tick data arriving too fast to process. At least 534 ticks were discarded.
Help
OK

You can control the length of time before RightEdge discards tick data with the Maximum

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Live Data Backlog setting. To avoid discarding data, you can reduce the number of symbols you retrieve data for, switch to a higher performance data store, or turn off the option to save raw tick data in the watchlist folder settings.

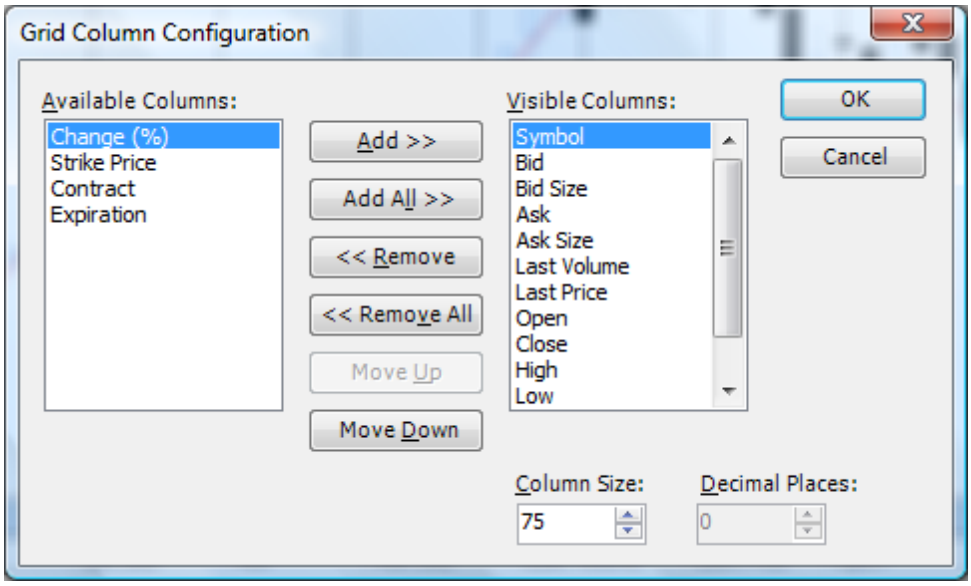
Tick data may also be dropped if the time for a tick is out of order, or if it is outside of exchange hours that you have specified in the live options.

Configuring the View

Different pieces of tick data are valuable to different systems and different asset classes. For example, the bid and ask portions of the tick are more valuable than the last price in the case of forex. To accommodate varying needs, the columns displayed as well as the column order are configurable and persist between program runs.

To change the order of the columns, simply click and drag a column. Release the mouse button when the column is dragged past the boundary of the target column. Using the above illustration as an example, to put the ***Last Volume*** column at the far right, click and drag the ***Last Volume*** column until it is past the rightmost border of the ***Change*** column.

Columns in the grid can also be added or removed. This is accomplished by right clicking anywhere in the grid and selecting the ***Configure Columns*** menu option.



The list on the left contains the columns that are not displayed currently but may be displayed if desired. The list of the right contains the columns that are currently displayed.

Click the ***Add >>*** button to move a column from the ***Available Columns*** list to the ***Visible Columns*** list. Click the ***Add All >>*** button to move **all** of the available columns into the visible columns list. Click the ***<< Remove*** button to move a column from the ***Visible Columns*** list back to the ***Available Columns*** list. Click the ***<< Remove All*** button to move **all** of the visible columns into the available columns list.

Once the desired columns are in the ***Visible Columns*** section, clicking a visible column entry will allow individual column manipulation. When a visible column is selected it can be ordered using the ***Move Up*** and ***Move Down*** buttons.

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Column Size will change the size of the currently selected column.

When applicable, the ***Decimal Places*** field will be enabled to allow setting a default number of decimal places when the value for this column is rendered.

See Also

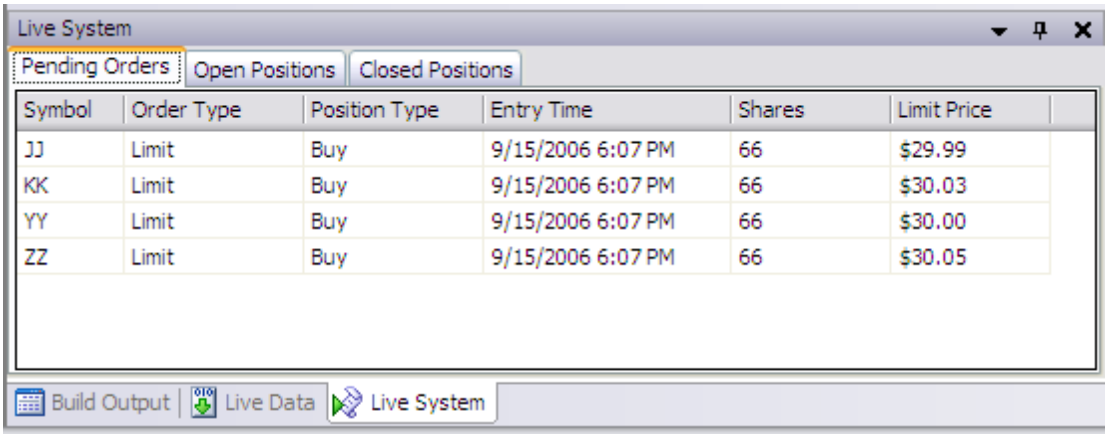
Using the RightEdge Environment
Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Chart Objects Pane
Live System Pane
Build Output Pane

8.10 Live System Pane

The live system pane contains information about a currently running system. The information is broken into three groups, ***Pending Orders***, ***Open Positions*** and ***Closed Positions***.

Pending Orders

Whenever a system submits an order to a broker (simulated or real), it will be displayed in the ***Pending Orders*** tab.



Symbol This is the symbol that the order belongs to.

Order Type The specified order type of this pending order. See the RightEdge supported order types for more information.

Position Type This is the assigned position action. There are four actions that can be performed. Buy to open a long position, short to open a short position, close to exit a long position and cover to exit a short position.

Entry Time The time that this order was submitted to the broker.

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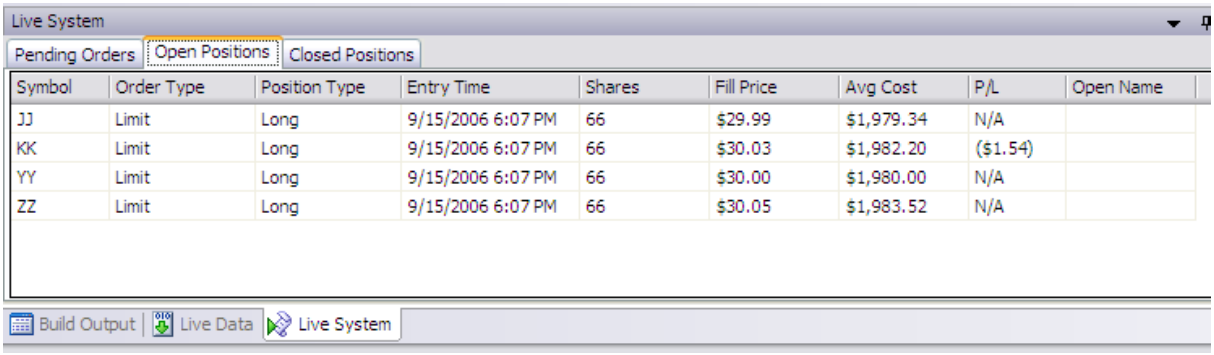
Shares The number of shares or contracts.

Limit Price If the order type is a limit order, the limit price is displayed here. For market orders, this column is not populated.

Open Positions

After a position is filled by the broker (simulated or real), it will be displayed in the ***Open Positions*** tab.


Live System
Pending Orders
Open Positions
Closed Positions
Symbol | Order Type | Position Type | Entry Time | Shares | Fill Price | Avg Cost | P/L | Open Name
JJ | Limit | Long | 9/15/2006 6:07 PM | 66 | $29.99 | $1,979.34 | N/A
KK | Limit | Long | 9/15/2006 6:07 PM | 66 | $30.03 | $1,982.20 | ($1.54)
YY | Limit | Long | 9/15/2006 6:07 PM | 66 | $30.00 | $1,980.00 | N/A
ZZ | Limit | Long | 9/15/2006 6:07 PM | 66 | $30.05 | $1,983.52 | N/A
Build Output
Live Data
Live System

Symbol This is the symbol that the order belongs to.

Order Type The specified order type of this open position, as it was in the Pending Orders screen. See the RightEdge supported order types for more information.

Position Type Specifies whether this position is long or short.

Entry Time The time that this order was submitted to the broker.

Shares The number of shares or contracts.

Fill Price The actual price that this order was filled at by the broker.

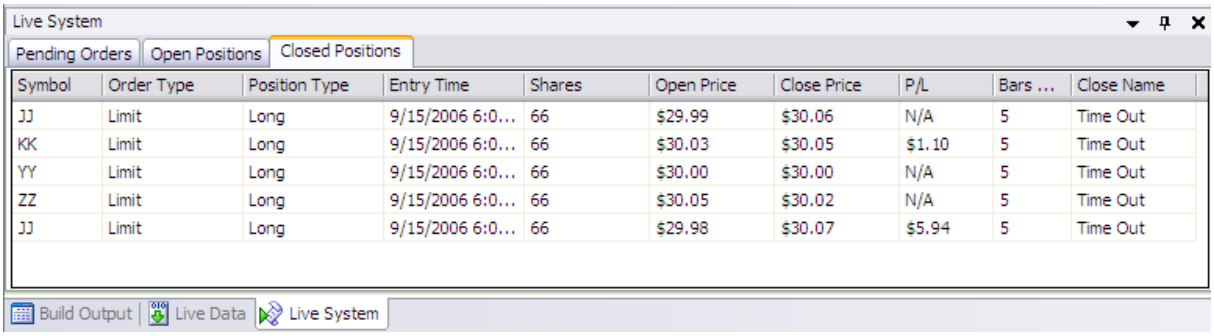
Avg Cost The amount of equity or initial margin used to open this position.

P/L Current profit or loss (unrealized) of this open position.

Open Name A user defined name given to this position.

Closed Positions

After a closing order is filled by the broker (simulated or real), it will be displayed in the ***Closed Positions*** tab.


Live System
Pending Orders
Open Positions
Closed Positions
Symbol | Order Type | Position Type | Entry Time | Shares | Open Price | Close Price | P/L | Bars ... | Close Name
JJ | Limit | Long | 9/15/2006 6:0... | 66 | $29.99 | $30.06 | N/A | 5 | Time Out
KK | Limit | Long | 9/15/2006 6:0... | 66 | $30.03 | $30.05 | $1.10 | 5 | Time Out
YY | Limit | Long | 9/15/2006 6:0... | 66 | $30.00 | $30.00 | N/A | 5 | Time Out
ZZ | Limit | Long | 9/15/2006 6:0... | 66 | $30.05 | $30.02 | N/A | 5 | Time Out
JJ | Limit | Long | 9/15/2006 6:0... | 66 | $29.98 | $30.07 | $5.94 | 5 | Time Out
Build Output
Live Data
Live System

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Symbol This is the symbol that the order belongs to.

Order Type The specified order type of this closed position, as it was in the Pending Orders screen. See the RightEdge supported order types for more information.

Position Type Specifies whether this position is long or short.

Entry Time The time that this order was submitted to the broker.

Shares The number of shares or contracts.

Open Price The original fill price when this position was opened.

Close Price The fill price of the closing order.

P/L The final or realized profit and loss.

Bars Held The number of bars or periods that this position was open.

Close Name A user defined name given to this close order.

Manipulating Grid Columns

Columns in all of the grids in the live system pane can be sorted and rearranged. To change the order of the columns, simply click and drag a column. Release the mouse button when the column is dragged past the boundary of the target column. Using the ***Closed Positions*** grid as an example, to put the ***Order Type*** column at the far right, click and drag the ***Order Type*** column until it is past the rightmost border of the ***Close Name*** column. Release the mouse button to set the new column position.

Click the left mouse button once on any grid column header to sort. Click again on the same column to reverse the sort.

See Also

Using the RightEdge Environment
Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Live Data Pane
Chart Objects Pane
Build Output Pane

8.11 Properties Pane

The properties pane is a dynamic pane the reflects configurable items for the currently selected object. Many objects in the RightEdge environment are configurable at run time. For example, if a trading system is open, the trading system properties are displayed in the properties pane when the top level item is selected. References and individual files also have configurable properties when selected.

The example below shows the properties of an indicator when it is selected on the chart or within the system properties.

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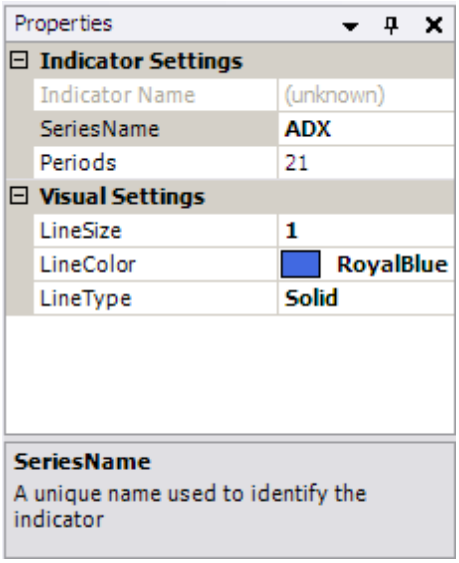
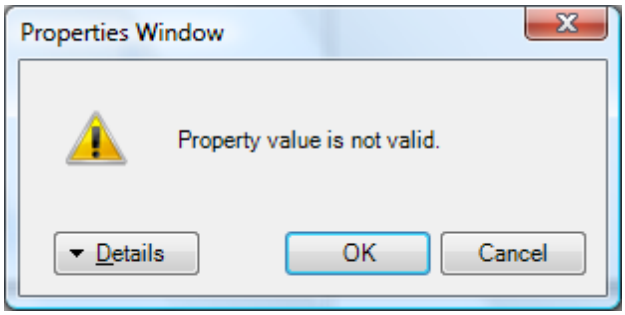


The controls for the properties are created with the appropriate type. For example, a configurable color will produce a color drop down. A field that requires a number will disallow non-numeric characters. If an invalid property is set, an error (shown below) is displayed.



The value will then revert back to the last known good value.

Each object in RightEdge that supports properties will contain additional information on properties specific to that object.

See Also

Using the RightEdge Environment
Indicator Pane
Chart Objects Pane

8.12 Output Pane

The Output pane displays messages that were generated by the system. Typically these messages are generated by the system author, however, there are some occasions where RightEdge may display information that is not critical to the system executing, but does require notification.

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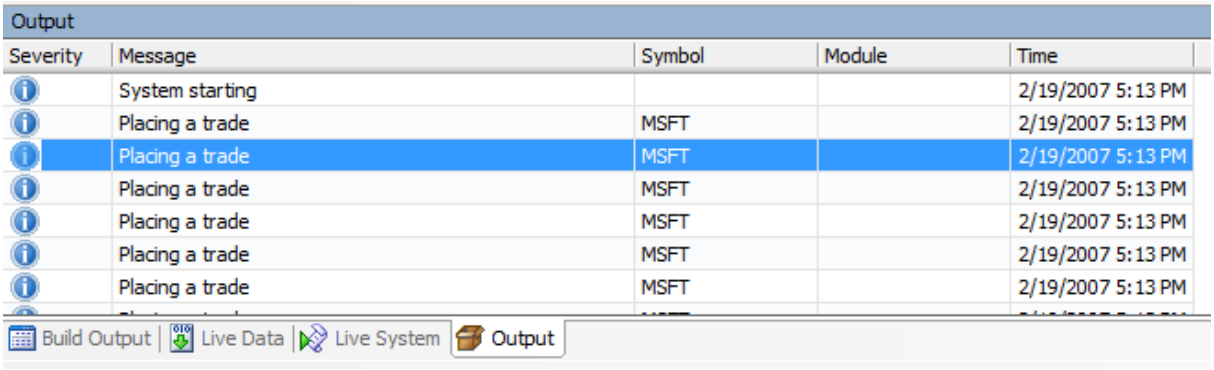

The illustration above shows a system that has items submitted to the output window.

Severity Contains the severity assigned to the message.

Informational	Informational severity typically indicates that no action is required.
Warning	A warning severity level typically indicates that no action is required at this time, but some action may be required to correct the problem encountered in the future.
Error	An error severity level typically indicates that a problem was encountered that could not be corrected or requires immediate correction from the operator.

Message Contains verbose information about the line item.

Symbol An optional field that relates the symbol to the message displayed.

Module An optional field that relates a module (trading system) to the message displayed.

Time The actual date and time that the message was placed into the output pane.

Note: Items in this list can be sorted by clicking on the column header.

See Also

Using the RightEdge Environment
Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Live Data Pane
Live System Pane
Chart Objects Pane

8.13 Build Output Pane

The build output pane displays the status of a system build. RightEdge contains a built in C# and Visual Basic.NET compiler. If a system is programmed in these languages, the results of the compilation are displayed in this pane.

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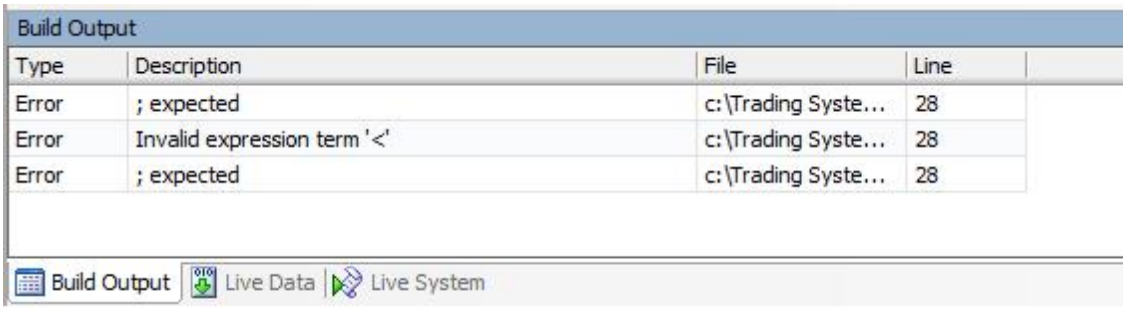

The illustration above shows a system that contains compiler errors. These errors must be addressed before a live system or backtest can continue. The build output pane will also display compiler warnings that do not have to be addressed before the system is executed.

Type Contains the message type. An error is critical, a warning indicates that it's a good idea to address before continuing.

Description Contains verbose information about the line item.

File Contains the fully qualified filename where the error resides.

Line Indicates the line number that the error or warning has been detected.

Double clicking on the line item will open the source file if it is not already opened. The line number displayed will also be scrolled into view.

Note: This pane is strictly for trading system developers who are writing source code and not applicable to drag and drop systems.

See Also

Using the RightEdge Environment
Trading System Pane
Watchlist Pane
Indicator Pane
System Components Pane
Live Data Pane
Live System Pane
Chart Objects Pane

8.14 Windows Dialog

This dialog box allows you to display, close, and arrange documents that are open in editors and designers. You can display this dialog box by choosing Windows from the Window menu.

Name

Displays the names of document and tool windows, with the item currently active selected.

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Path

Displays the full path for documents. Windows typically do not have a path.

Activate

Makes the document or tool window selected the active item in the editor or designer.

Close

Closes the selected documents and windows in the list.

Save

Saves the selected documents and windows in the list.

See Also

Using the RightEdge Environment

8.15 Using the Editor

The Code and Text editor is the word processor of the integrated development environment (IDE). When it is used to edit text, it is referred to as the Text Editor. When used to edit source code in a development language, its most common use, it is referred to as the Code Editor. You can open multiple Code Editors to view the code in different files, and copy and paste among them. A list of all documents opened for editing in instances of the Code Editor is available in the Windows menu.

Select the topics below to get relevant information quickly.

- Code Window Components
- Editing Text
- Editor Features

Code Window Components

Code Pane

The area where code or text is displayed for editing. It provides statement completion for the C# language.

Indicator Margin

A gray column on the left side of the Code Editor where indicators such as bookmarks are displayed.

Selection Margin

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A column between the Indicator Margin and the editing window where you can click to select lines of code. Changes to code are tracked here when you select the Mark Modifications option from the Edit menu.

Horizontal and Vertical Scroll Bars

Allows you to scroll the Code Pane horizontally and vertically so that you can view the code that extends beyond the viewable edges of the Code Pane.

Editing Text

The editor provides the customary functionality of a text editor or word

processor. The procedures to select, copy and paste text and code are familiar and consistent. The editor also provides automatic statement completion in C#, syntax checking, keyword colorization, and other services.

There are various ways to move through text or code in the Code Editor using the mouse and navigation keys:

- Use the arrow keys to move one character at a time, or the arrow keys in combination with the CTRL key to move one word at a time. Arrow keys move one line at a time also.
- Click a location with the mouse.
- Use the scroll bars or scroll wheel on the mouse to move through the text.
- Use the HOME, END, PAGEUP, and PAGEDOWN keys.
- Use CTRL+PAGE UP and CTRL+PAGE DOWN to move the insertion point to the top or bottom of the window, respectively.
- Use CTRL+UP ARROW and CTRL+DOWN ARROW to scroll the view without moving the insertion point.

Cut, Copy and Paste

As mentioned previously, the procedures to perform cut, copy and paste operations are standard. Click on the selection margin with the left mouse button and drag the mouse up or down. Selected text should now be highlighted in gray. Copy text by selecting Copy from the Edit menu. Cut the text by selecting Cut from the Edit menu. Pasting will remove the selected contents and paste what the text that is currently available on the clipboard.

Find and Replace

The code editor features an extremely powerful find and replace capability. Find operations support these options:

- Text searching
- Regular expression-based searching and substitutions
- Wildcard-based searching
- Match group capturing
- Case matching
- Whole word matching
- Backwards searching
- Search hidden text option

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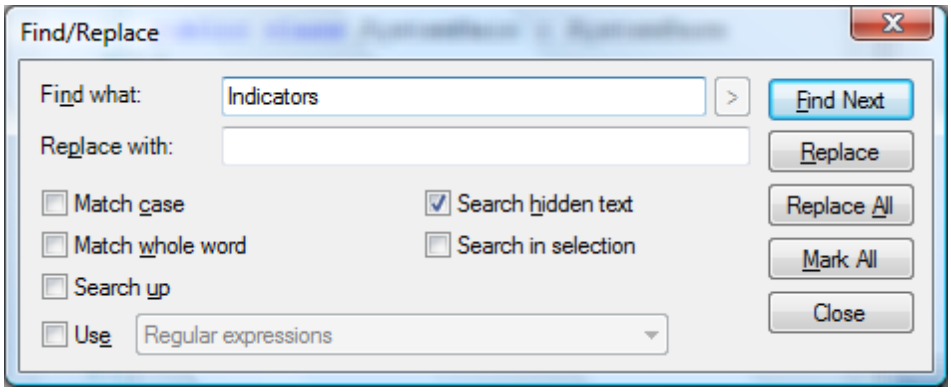
- Search in selection

To invoke a simple find, select the Find item from the Edit menu.



When text is typed into the Find what text area, the Find Next button will enable. The Find dialog will stay on top of the code editor and highlight any text that is found. Use the Close button to dismiss the Find dialog.

Editor Features

Fonts and Colors

This fonts and colors in the code editor are customizable. The Options screen contains a listing of colors and fonts to choose.

Syntax Highlighting

RightEdge recognizes language elements for C# and Visual Basic and highlights those language elements accordingly. Use the Options dialog to set the colors of each individual language element.

Bookmarks

You can mark lines in your code files with bookmarks. Bookmarks are a way to quickly navigate to previously marked lines of code. To set a bookmark, select the Bookmarks menu item from the Edit menu, followed by the Toggle Bookmark item. Bookmarks are shown in the indicator margin as a blue rectangle.

Outlining

Outlining is used to visually organize sections of code. To the right of the indicator and just left of the source code, a tree line with an expand and collapse control is displayed. To collapse a section of code, click the "minus" symbol. A collapsed region can be identified by an ellipsis (...) in the editable region. Click the "plus" symbol to expand this region.

Statement Completion (C# Only)

Statement completion is enabled as code is typed into the code editor. Specific language elements will automatically trigger the proposed completion path. This allows you to keep your context, find the information you need, and insert language elements directly into

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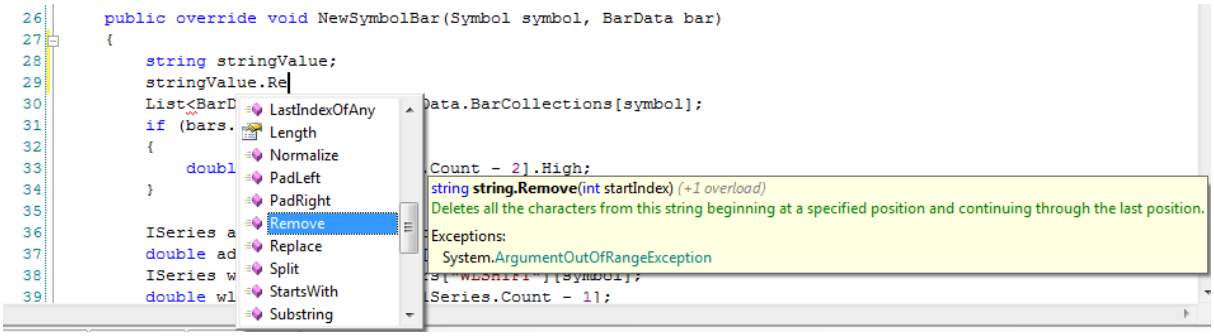
your code.



Line Numbering

You can turn line numbering on and off in the Options dialog box. To jump to a particular line, choose Goto Line on the Edit menu or press CTRL+G.

Coding Problem Indicators (C# Only)

As you enter and compile code in the Code Editor, wavy lines appear beneath code that is incorrect or could cause a problem. These are sometimes called "squigglies."

Code Snippets

The editor supports Visual Studio style code snippets. RightEdge ships with code snippets for performing common tasks. These definitions are installed in the Application Data \Snippets folder. Snippets can be created by adding snippet definitions to the corresponding folders.

To use a code snippet, begin typing the shortcut within the editor window. For example, to create a class definition, start by typing the word 'class' onto an empty line followed by the tab key. The code will be autogenerated and allow you to define your class name.

See the Code Snippets topic for detailed information about using and creating code snippets.

8.16 Editor Colors

The code editor within RightEdge has configurable colors to aid in the recognition of key parts of the code such as keywords, comments, numbers, strings, etc.

Each language can be configured independently through the Editor Colors dialog shown below.

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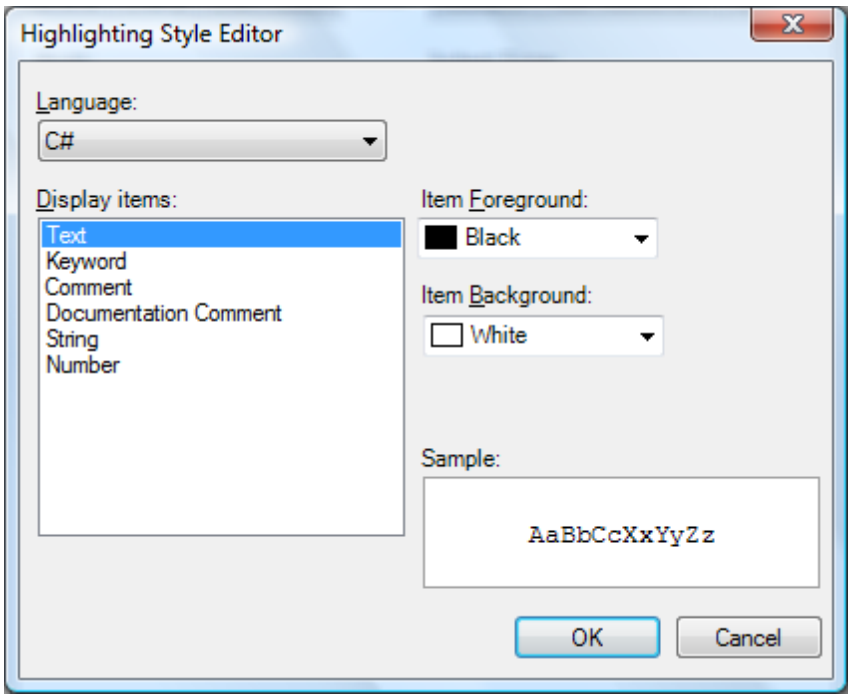

Select a language from the ***Language*** dropdown list. The color items will then be displayed in the ***Display Items*** list.

Select an item from the list and use the ***Item Foreground*** and ***Item Background*** dropdown lists to pick the desired color. The ***Sample*** window will update when the selection is changed to demonstrate when the current color selections will look like in the editor window.

See Also

Editor Settings

8.17 Code Snippets

A code snippet is a fragment of code that you can store for reuse within the code editor at a later time. Microsoft introduced an open standard for code snippets starting with Visual Studio 2005. The editor honors this format. RightEdge ships with a number of code snippets that are contained in the AppData\Snippets directory. There are code snippets for both C# and Visual Basic.

When a code snippet is activated, it inserts its text into the editor. If there are fields declared in the code snippet, they are highlighted within the inserted code. This easily facilitates naming items that are typically variable but are required to complete the code snippet. To move around these fields, hit the Tab key. To indicate that all fields have been named, hit the Enter key. If more than one field use the same declaration, then the secondary fields are flagged as dependent on the primary field for the declaration. They automatically update whenever the text in the primary field is updated.

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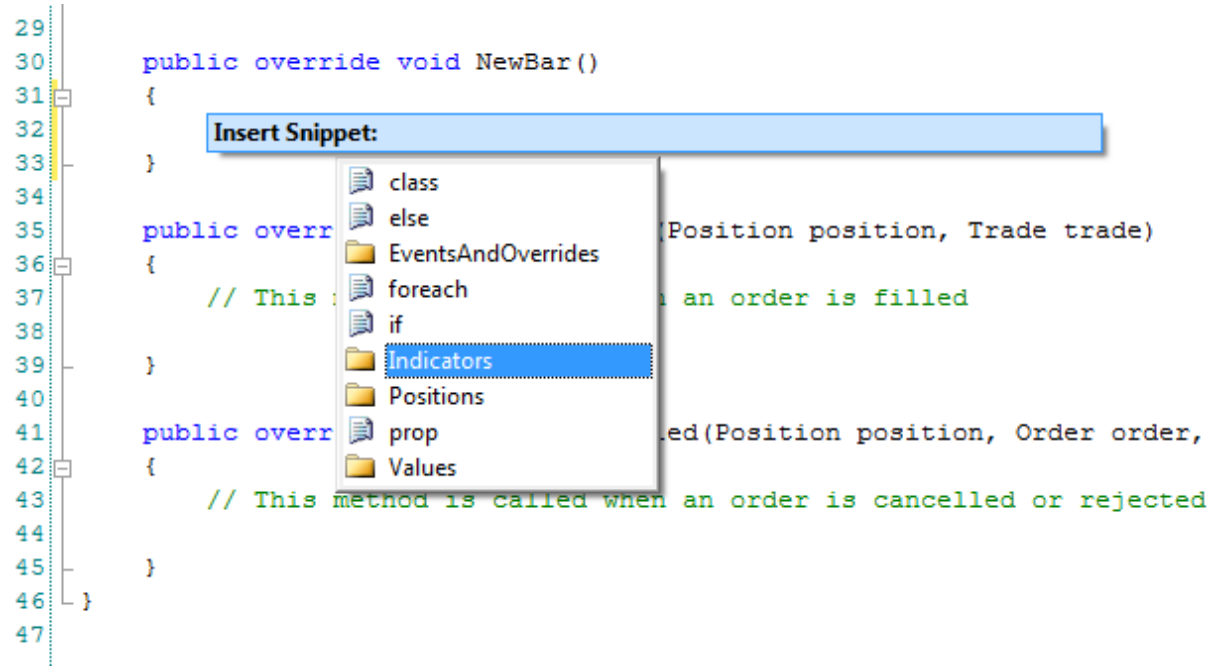
Using Code Snippets

To use a code snippet, begin typing the shortcut within the editor window. For example, to create a class definition, start by typing the word 'class' onto an empty line followed by the tab key. The code will be auto-generated and allow you to define your class name. Code snippets may also be invoked via the *Insert Snippet* command on the *Edit* menu or by right clicking in the editor window and selecting *Insert Snippet*.



The up and down arrow keys also allow for selection of items in the list. The Tab and Enter keys pick the selected folder or code snippet, while the Escape key cancels the popup. If a folder is picked, the folder is traversed into and its contents are displayed in the list. Code snippets are grouped in the list through a directory structure on disk. The name shown in the list for each snippet indicates the shortcut name that will invoke this snippet when typed into the editor.

In the sample below, prop followed by the Tab key were entered into the editor window to invoke a property snippet.

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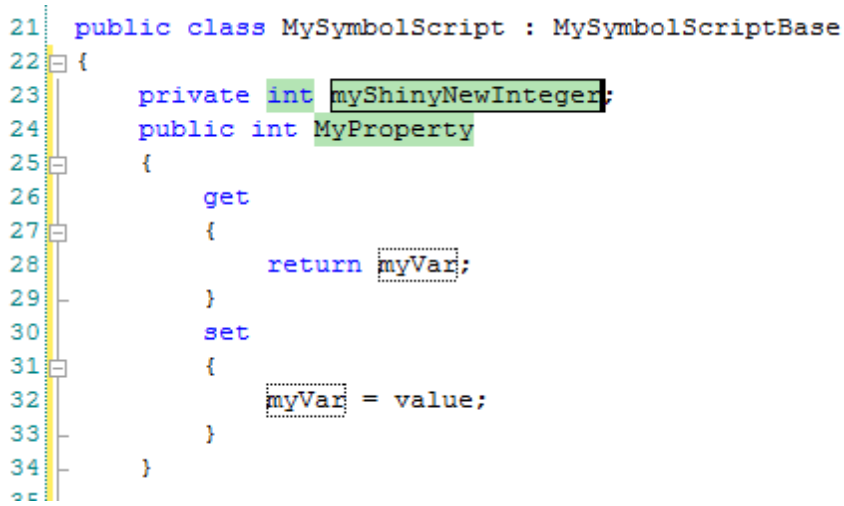

If a code snippet requires additional items, these fields are highlighted and represent the regions of text that need to be edited to complete the code snippet. While the caret is in a field, the Tab key can be used to navigate to the next field. Likewise, Shift+Tab navigates to the previous field.

The active field is drawn with a line around it. Sometimes a field refers to a declaration that is used in multiple places within the code snippet. In that case, only the first field is designated as editable. When its value changes, the other fields that are dependent on it automatically update. The dependent fields are drawn with a dotted line around them.

Creating Code Snippets

As mentioned, RightEdge ships with a number of code snippets that are ready to use. In some cases it may be desirable to create your own code snippets. The snippets follow the format put forth by Microsoft.

A code snippet is simple an XML-formatted file on the file system that contains a .snippet extension. These are placed in RightEdge's AppData\Snippets folder underneath the corresponding folder (C# and VB.NET). The code snippets that ship with RightEdge can be examined and changed with any text editor. The full schema definition can be found in the Visual Studio documentation.

The example below is a quick analysis of the basic nodes within a code snippet file. This snippet is the contents of the current close snippet.

```
<?xml version="1.0" encoding="utf-8" ?>
<CodeSnippets  xmlns="http://schemas.microsoft.com/VisualStudio/2005/CodeSnippet">
	<CodeSnippet Format="1.0.0">
		<Header>
			<Title>Current Close</Title>
			<Shortcut>close</Shortcut>
			<Description>Code snippet for current close value</Description>
			<Author>Yye Software</Author>
		</Header>
		<Snippet>
			<Code Language="csharp"><![CDATA[Close.CurrentValue]]>
			</Code>
		</Snippet>
```

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```
        </CodeSnippet>
</CodeSnippets>
```

Each code snippet starts with a <CodeSnippets> tag and the <CodeSnippet> itself is contained within. The first four lines and the last three lines of the file should never need modification.

The <Header> blocks contain information about the code snippet. The title of the code snippet is a descriptive name. The shortcut is used to allow the developer to quickly invoke this code snippet.

The <Snippet> tag itself contains the meat of the snippet definition. The language is specified in the <Code> tag followed by a CDATA element that contains the actual code that is inserted. This simple example takes no parameters.

Once you have a firm understanding of this example, consider opening some of the more complicated snippets, especially those taking parameters to realize the full power of code snippets.

Note: The editor window loads the code snippets when it is opened. If you modify or create a code snippet, simply close all editor window instances and load them again.

8.18 Floating Documents

The document area will contain document like items such as charts and source files. Documents cannot be docked within other panes, however, documents can be split within the document area or "float". Click the tab area of the document with the left mouse button and begin to drag the tab.

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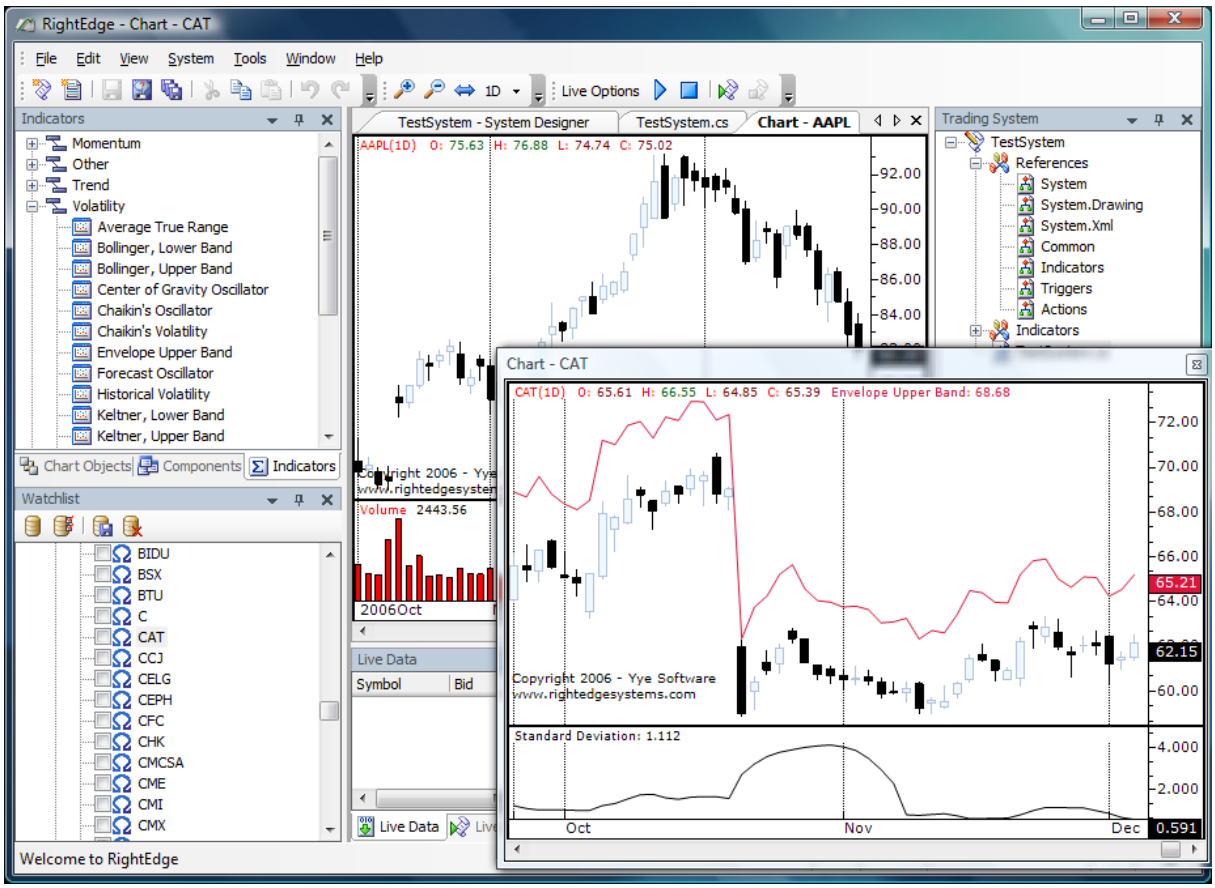

Notice that the chart for CAT is outside of the main RightEdge application window. This chart can be dragged anywhere on the screen or even to another monitor. It will continue to update (if in live data mode) just as if it were within the main application window.

To snap the chart or document back to the document area, simply grab the title bar portion of the floating window and drag it back to the document area.

See Also

Using the RightEdge Environment

8.19 Trading System Project Properties

Selecting the ***Properties*** menu item when right clicking on the project node in the Trading System pane brings up the properties dialog for this system.

Compiler

The compiler tab contains options that are relevant to the compiler. These are options that are passed to the compiler immediately before the compilation process.

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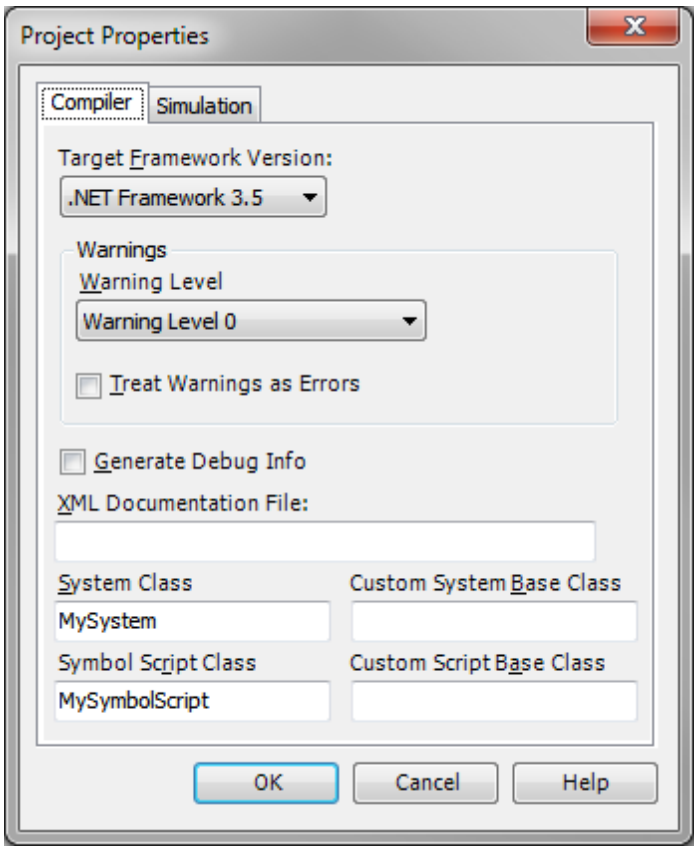

Target Framework Version

Select which version of the .NET Framework that this trading system should be compiled with. It is highly unlikely that this will ever have to be changed.

Warning Level Valid settings are level 0 through 4.

Warning Level	Meaning
0	Turn off all warning messages.
1	Only display warning messages that are considered severe.
2	Displays all severe plus selected "less than severe" warnings.
3	Displays all level 2 warnings plus all warnings that are considered more severe than "informational".
4	Displays all warnings including those that are informational.

Treat Warnings as Errors By default, only errors can halt the compile and run process. If this is set, warnings will also halt the process.

Generate Debug Info If checked, this option causes the compiler to generate debugging information and place it in the output file.

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Note: Generating debug information may have some impact on execution speed.

XML Documentation File If specified, XML documentation will be derived from the comments in the source files. See Using XML Comments for Documentation for more information.

The following class settings are recommended for advanced users only.

System Class This specifies the name of the System class that RightEdge will instantiate when your system assembly is loaded.

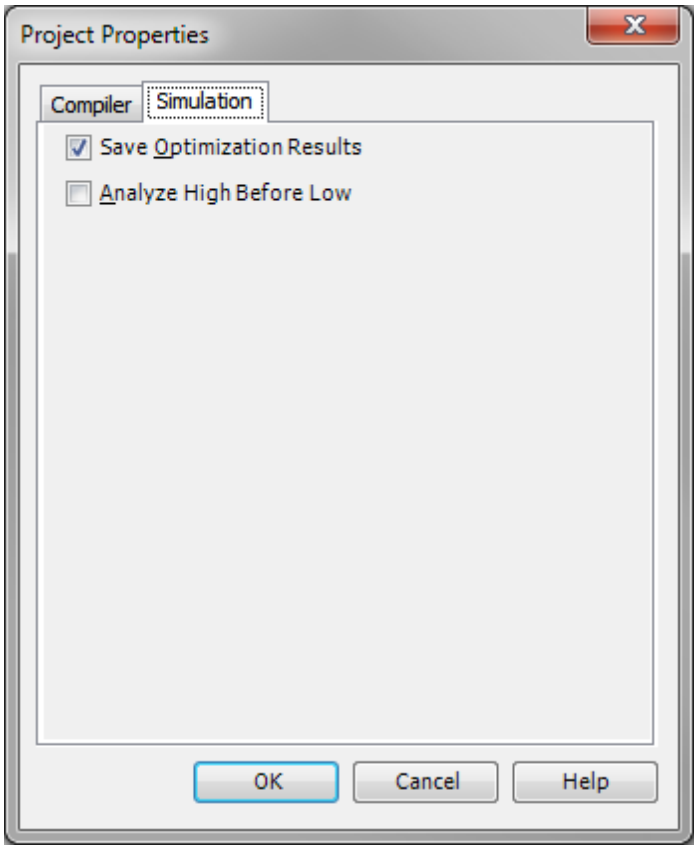
Symbol Script Class This specifies the name of the SymbolScript class that RightEdge will instantiate when your system system assembly is load.

Custom System Base Class Allows you to insert your own custom system class in between the base system and the actual system class.

Custom Script Base Class Allows you to insert your own custom script class in between the base SymbolScript and the actual SymbolScript class.

Simulation

The simulation tab contains options that are relevant to running a system against historical data, or "backtesting".



Save Optimization Results For every optimization run, the run data in its entirety is

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saved to disk for later retrieval. In situations where the number of runs are large, this may not make practical sense. If optimization results are not saved, only summary data for the optimization run will be available. Any attempt to drill down from the optimization summary screen will result in an error.

You may now load these optimization results files for later use. Simply use the *Open System Results...* menu option on the *File* menu.

NOTE: Optimization results files will not be compatible between different builds of RightEdge. This is meant for gathering temporary run information.

Analyze High Before Low Typically in a simulation, tick data or lower level data may not be available. Without that data is impossible to know in which order the high or low of the period was hit. RightEdge defaults to processing the low tick first. Place a check next to this option to reverse that behavior.

See Also

New Trading System
Trading System Pane

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9 Options

9.1 RightEdge Program Options

RightEdge comes with a number of program level options. These options are available to customize your RightEdge experience. To select the options, click the ***Options*** item from the ***Tools*** menu.

The Options dialog contains the following tabs.

Chart Colors Used to configure the colors of the various items on the candlestick or bar charts.

Chart Options Configure the various visual aspects of the chart such as chart style, scale, bars per page.

Editor Options Configures the source code editor options such as font, colors, tab size, etc.

General Options Configures global options for RightEdge. Items such as data store, currency, etc.

Live Options Options specific to running live systems. Items such as position management, broker interfaces, etc.

Research Options Configures settings that aid in quickly determining relevant information about a particular symbol.

Risk Assessment Contains settings that allow hiding and revealing certain risk assessment calculations performed after a simulation run.

System Results Options Settings for the customizing the System Results screen

See Also

Chart Colors
Chart Options
Editor Options
General Options
Live Systems
Research Options
Portfolio Risk Assessment Options
System Results Options

9.2 General Options

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The General options contain a number of settings that are global in nature to RightEdge.

Available Data Stores Displays the currently installed data stores. RightEdge is configured to use a local data store, that is, all bar and tick data is saved to the local

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hard disk. Other data stores include stores that will allow data to be saved to a database or XML file.

If a data store requires additional information to function properly, the ***Setup...*** button immediately to the right of the list of data stores will enable. The setup for the various data stores will vary.

> **Note:** Changing a data store can have serious implications including loss of data. Please thoroughly understand the changes that will be made before committing them.

Account Currency The currency type of available cash with the broker. The account currency can be set to any of the supported types and trades may be made in a different currency. RightEdge will perform the currency conversion back to your account currency. Note: Historical currency data will have to be available for this conversion to work.

Apply Interest to open Forex Positions Specifies whether or not to debit or credit interest from open positions.

Forex Rollover Time The time of day that a spot forex position is rolled over by the broker. This is typically the time of day where interest is either debited or credited from your open positions.

Close Data Download window on successful download Indicates if the progress window that is displayed while downloading historical data should be closed upon a successful download. If unchecked, the data download dialog will not automatically dismiss itself. Regardless of this setting, the data download dialog will remain active if an error is encountered during the retrieval process.

Warn about bar data gaps when running system Before backtesting, RightEdge loads all the bar data that will be used in the backtest. Before passing the data into the system, the data is synchronized. If a bar exists for one symbol and not another, selecting this option will warn of this encounter. This will not prevent the simulation from continuing, but is used as a means of ensuring data integrity.

Movable Position Labels RightEdge will generate position labels within a chart. Check this option to enable the ability to move these labels by clicking and dragging them. Uncheck this option to have label stay in place.

Minimum Backfill Specifies the minimum number of days a backfill of historical data will retrieve.

Recent Project List Size This number specifies the number of projects that will be displayed in the "most recently used" list. This is located off of the ***File*** menu under ***Recent Projects***.

Remember Last Open Project If selected, the last trading system that was opened when RightEdge was closed, will be re-opened upon the next run.

Show Start Page Indicates whether or not to display the start page automatically on program start.

See Also

Chart Options
Chart Color Options
Editor Settings

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Risk Assessment Options
Research Options
Live Systems
System Results Options

9.3 Chart Options

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The Chart options contain a number of settings that pertain to the price charts in RightEdge.

Chart Style Specify the display style of price data. Available options are candlestick, stick (also referred to as OHLC charts) or line charts.

Default Bars per Page Specifies the default number of price points that are displayed on a chart.

Chart Scale Specifies the default scale for the chart. A normal chart indicates that all vertical price points are represented equally. A logarithmic scale skews the vertical points so that a given distance always represents the same percentage change in price.

Decimal Places Specifies the number of points values on the chart are carried out to.

Show Crosshairs Check this field to show crosshairs on the chart. Crosshairs are drawn immediately underneath the current mouse position. Horizontal and vertical lines will extend to their respective axis point.

Show Horizontal Grid When checked, horizontal grid lines will be drawn along each tick.

Show Vertical Grid When checked, vertical grid lines will be drawn along each tick.

Show Crosshair Label Check this field to display labels at the horizontal and vertical ends of the crosshair. The horizontal and vertical lines that extend from the crosshairs will end at the horizontal and vertical axis points and display the current values for their respective axis.

Date/Time on All Panes If this field is checked, the date and time that runs along the horizontal axis will be displayed on each pane. If this is is unchecked, the date and time will only be displayed on the bottom most pane.

Chart Font Click this button to set a default font for text items in the chart. Items such as price data, indicator data and date time data will use this font when the chart is drawn.

Show Position Labels Position labels are drawn on the chart when positions are opened or closed. A trading system that has a high number of trades may cause the labels clutter the chart. The labels, in that case, can be turned off. In most cases and by default, the labels are turned on. To information regarding controlling the colors of the position labels, please see the Configure Position Labels topic.

See Also

General Options

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Chart Color Options
Editor Settings
Live Systems
Risk Assessment Options
Research Options
System Results Options

9.3.1 Configure Position Labels

Select Colors For The two options are Account Credit and Account Debit. When a position is opened, this is an account debit and the specified colors will be used for that position label. When a position is closed, this is an account credit and the specified colors will be used for that position label.

Text Color Specifies the color of the text for the position label.

Background Color Specifies the background color of the position label.

Font Specifies the font used in the text of the position label.

Show Detailed Label Indicates whether or not the position label will show P/L details in the label or simply denote a buy or a sell.

See Also

Chart Options
Chart Colors

9.4 Chart Color Options

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The Chart Color options contain a number of settings that pertain to the price chart appearance in RightEdge.

The ***Chart Components*** list contains the items in the chart that can have their color configured. Select an item in this list and select the desired color in the ***Color*** selection box. The mini chart below that is a preview of what the color selection change will look like if applied.

Below is a list of chart components that can be configured and an explanation of the area of the chart that is affected.

Chart Text Color The default color of the text that appears on the chart. This can be overridden on an individual basis, such as by an indicator color.

Candle Up Color The color of the candle body or OHLC line when the closing price is higher than the opening price. It is standard to make this a light color.

Candle Up Border The color of the border line around the candle body when the closing price is higher than the opening price.

Candle Down Color The color of the candle body or OHLC line when the closing price is lower than the opening price. It is standard to make this a dark color.

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Candle Down Border The color of the border line around the candle body when the closing price is lower than the opening price.

Volume Bar Color When a volume chart is displayed, a volume bar will be filled with the specified color.

Volume Bar Border When a volume chart is displayed, the border line around the volume bar will use the specified color.

Chart Frame Color The frame contains the horizontal and vertical values and tick marks. This setting represents the background color for this area. Use this in conjunction with text color to ensure readability.

Chart Background Color The background of the price action area of the chart.

Chart Border Color The line that separates the price action area of the chart and any panes that exist within the entire chart area.

Tick Line Color Tick lines are value intervals. Each tick is a small line that extends from the right edge of the chart towards the actual value.

Axis Color The axis color specifies the foreground color of items drawn within the axis labels.

Crosshair Color If the crosshair is enabled, this specifies the color of the crosshair lines.

Crosshair Text Foreground If the crosshair label feature is enabled, this specifies the foreground color of the crosshair label.

Crosshair Text Background If the crosshair label feature is enabled, this specifies the background color of the crosshair label.

Zoom Selection Color Charts can be zoomed by holding the mouse cursor and dragging to select the desired area. A selection rectangle or zoom selection is drawn. This setting will specify the color of this selection rectangle.

Multiplier Background Color Typically the volume chart will display a multiplier, since the digits contained within the volume will not fit. The multiplier tag will show the multiplier of the values displayed. This setting will specify the background of the multiplier tag.

Multiplier Border Color Set the border color around the multiplier tag.

Grid Line Color If configured, vertical and horizontal grid lines will extend from the ticks along the vertical and horizontal axes. Use this setting to configure the color used to draw the grid lines.

Price Label Positive Change The price of the bar where the mouse cursor is hovering is displayed in the upper left corner of the chart. Positive and negative price changes are represented in different colors. Use this setting to change the color of a positive price change.

Price Label Negative Change Use this setting to change the color of a negative price change.

Price Label No Change Use this setting to specify the color of the price label when there is no price change for the bar.

Last Price Color The tag at the far right side represents the current price of the latest

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bar. The color of this tag can be changed with this setting.

See Also

General Options
Chart Options
Editor Settings
Live Systems
Risk Assessment Options
Research Options
System Results Options

9.5 Editor Options

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The Editor options contain a number of settings that pertain to the editor window appearance as well as the look and feel.

Font Specify the font that the text contained within the editor window will be displayed in.

Font Size Indicate the size for the font specified above.

Indent Type The default is smart indent. Smart indention sets the editor to perform indention where it is typically desired in source code. For example, if a branch statement is performed such as an "if" statement, the lines that follow the true branch of this "if" statement will typically be followed by a "{" in C# or a "Then" in Visual Basic.NET. The editor will automatically perform this indention. Uncheck this setting to perform the indention manually.

Bracket Highlighting When bracket highlighting is enabled, and the editor cursor is over a bracket, the corresponding bracket in the editor will be highlighted.

Show Whitespace When enabled, this option will represent the whitespace in the editor with a ".".

Virtual Space Turn this setting on to allow the cursor to exist at any column within the editor. With this disabled, the cursor will always revert to the end of the line if the previous line's length is greater than the current line's length.

Convert Tabs to Spaces When enabled, this setting will convert all tab characters to the appropriate number of spaces before saving the file.

Show Indention Guides When enabled, will draw a faint vertical line along each tab or indention boundary.

Show Line Numbers When enabled, creates an area to the far left of the editor window which will contain the line numbers.

Tab Size Specifies the number of character spaces that are inserted when the tab key is pressed.

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Colors Configure the colors for various items within the editor. Refer to the Editor Colors section for additional information.

See Also

Using the Code Editor
General Options
Chart Options
Chart Color Options
Live Systems
Research Options
Risk Assessment Options
System Results Options

9.6 Research Options

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The Research options contain settings that aid in quickly determining relevant information about a particular symbol. When items are setup for research, the context menu in the Watchlist will be populated at the symbol level.

For example, if a symbol is generating a buy or a sell or just simply moving unexpectedly, items such as news or company fundamentals can be brought up in a timely manner.

Research Item Type RightEdge comes configured with four research items, News, Quote, Chart, Other (user defined). Select the item from the list to be configured.

Site Parameters Enter a web address (URL) that will be navigated to when this research item is selected.

Replaceable Parameters

Replaceable parameters are the heart of this piece of functionality. RightEdge acknowledges four different types of parameters.

- %s will insert the ticker symbol for the symbol selected for research.
- %c will insert the company name (if configured) selected for research.
- %i will insert the industry field (if configured) selected for research.
- %f will insert the sector (if configured) selected for research.

See the Symbol Information section for more information about setting these items in the symbol information.

For example, to configure a news item to visit the Yahoo Company Headlines for the selected symbol, set the URL to http://finance.yahoo.com/q?s=%s. If the selected symbol is Microsoft, the URL would become http://finance.yahoo.com/q?s=MSFT and the appropriate page would be displayed.

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9.7 Risk Assessment Options

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The Risk Assessment options contain settings that allow hiding and revealing certain risk assessment calculation performed after a simulation run.

Since different risk assessment calculations are of different value to different people in different situations, this list allows you to turn risk assessment calculations on and off. Some risk assessment calculations are expensive with regard to calculation time. Use the ***Portfolio Risk Assessment Plugins*** list to select the desired calculations.

RightEdge ships with the list of risk assessment plugins below.

- Sharpe Ratio
- Profit Factor
- Risk Adjusted Return
- Recovery Factor
- Payoff Ratio

Third Party Risk Assessment Plugins

RightEdge supports the use of risk assessment plugins written by third parties. You may even create your own risk assessment plugin. Place any additional risk assessment plugins in the application's plugin directory and they will be displayed in the list.

Consult the RightEdge Developer's Guide for additional information regarding development of third party risk assessment plugins.

See Also

General Options
Chart Options
Chart Color Options
Editor Settings
Research Options
System Results Options

9.8 Live Systems

You can specify settings for a variety of RightEdge features by changing options in the Options dialog box.

The Live Systems options contain a number of settings that pertain to the startup and behavior of live trading systems in RightEdge.

Saved Open Positions RightEdge will remember the positions that it opened during a live system run. Upon exiting a system, these positions will be saved for recall when the

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system is run again. The options below will tell RightEdge how to handle these positions when a live system is restarted and open positions were recorded.

Prompt user to select which positions are still open A screen is displayed with a list of the open positions. Select the positions to move as open in the current system run.

Ignore open positions This will bypass the screen and assume no positions are to be carried forward.

Automatically accept saved open positions This option bypasses the prompt screen and assumes all positions are to be carried forward into the new system instance. **Use this with caution.**

Auto Reconnect on Error Enable this option to have both the real time data and broker plugins reconnect if an error occurs. A notification will be sent to the output pane upon disconnection and a successful reconnection.

Note: The plugins will reconnect indiscriminately. Enable this with caution.

Ignore system generated warnings RightEdge will provide warnings when certain certain conditions look suspect. These warnings are placed in the Output pane. Sometimes these warnings are acceptable and may be ignored. With this option enabled, RightEdge will not generate live system warnings.

Use Broker Buying Power Depending on the capabilities of the broker and/or broker plugin, RightEdge may have the ability to use the buying power as given by the broker. If using the real broker buying power is not desired, uncheck this option to use the starting capital figure specified as the buying power.

Warn before executing live systems RightEdge can provide live trade executions against real brokers. If system code doesn't run as expected or the system was not intended to run against a live broker, this can present substantial risk. This warning will be displayed before the live system executes against a live broker to prevent inadvertent system starts with live brokers attached.

Run full simulation before starting live system If selected, RightEdge will run a simulation first before going into live mode. Depending on your system parameters, this may take some time. However, all simulated positions that were generated will be shown on the live system, but no orders for the simulated trades will be placed with a live broker.

Ignore Data Outside of Exchange Hours

It may be desirable to begin running a live system before the official opening of the exchange. However, before and after market data can tick and will be passed along to the live trading system. In cases where this is not desired, enable this option and set the exchange hours. Any data that is received outside of these hours will be displayed be shown on the live data window and will be collected by the data store, but will not be passed along to the live system itself.

Maximum Live Data Backlog (seconds) Sets the number of seconds that live data processing can lag behind live data collection before data will be discarded in an attempt to catch up. See also Discarding Live Data

See Also

General Options

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Chart Options
Chart Color Options
Editor Settings
Risk Assessment Options
Research Options
System Results Options

9.9 System Results Options

System Results are external plugins that are loaded by RightEdge after a run has completed. RightEdge contains a number of system results plugins out of the box. Much like the risk assessment tab, certain plugins are of different value in different situations. RightEdge allows the user complete control of which plugins are shown by default. In addition to this, result plugins may be toggled on the fly via the ***View*** menu.

Since these are fully external, utility developers are welcomed to develop their own system result plugins. Please refer to the developer documentation as well as the sample code that is installed for additional information.

To distribute a system result plugin, simply install or copy the assembly that contains the plugin into the RightEdge plugin directory. RightEdge will automatically detect it as a system results plugin and display it to the end user.

System Results Charts Place a check next to each chart name to have it displayed by default after a simulation has completed.

See Also

General Options
Chart Options
Chart Color Options
Editor Settings
Research Options
Risk Assessment Options

9.10 Managing Frequencies

A trading system can run at one or more different frequencies. A frequency is simply some unit used to form a bar of data. Typically a period of time comprises a frequency. 1 minute, 5 minute, 60 minute, or daily are some typical frequencies that trading systems are developed to run under. In addition to time based frequencies, frequencies can also be based on ticks, volume, astrological alignments and anything else that can be measured.

RightEdge ships with three frequency plugins. Time, tick and constant volume plugins.

The *Saved Frequencies* tab is a central place to manage and configure frequencies that will be available to trading systems.

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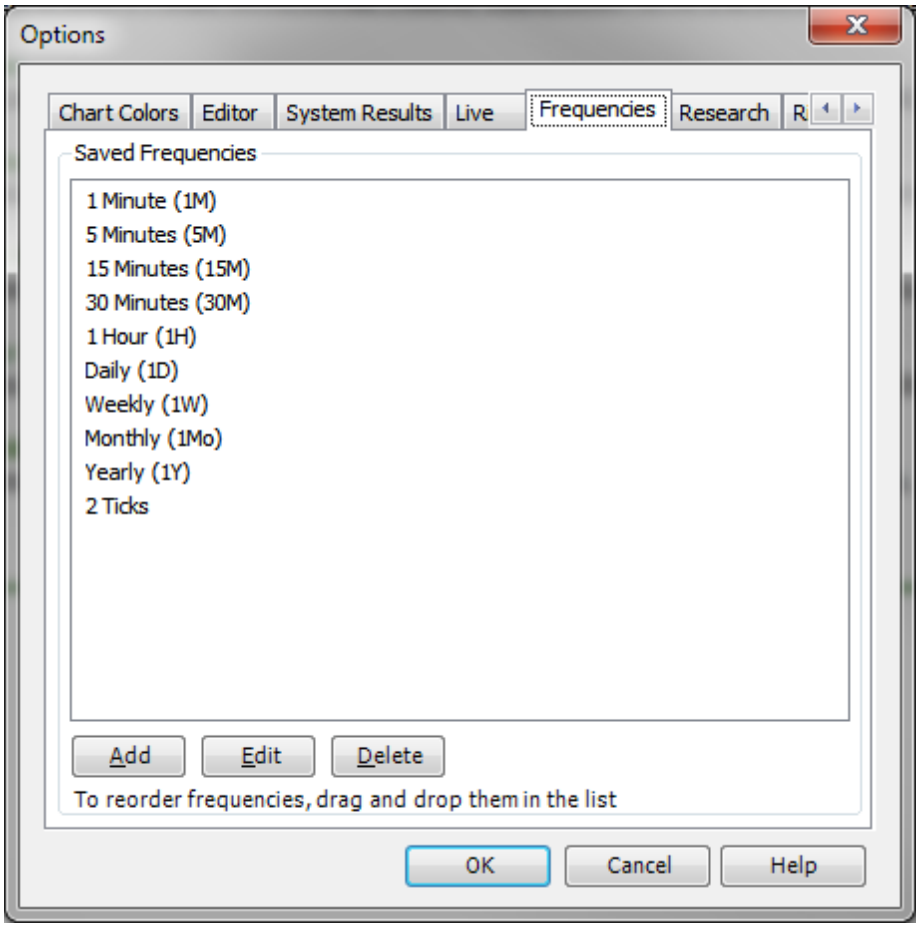

The *Add*, *Edit* and *Delete* buttons allow control over which frequencies are available to trading systems. Changes are saved in real time.

Click and hold the left mouse button on an item in the list and drag to move that frequency item to a different location in the list.

Note: To select a frequency for a trading system, select the Frequency section under the General subheading in the Trading System Properties pane.

Note: As stated above, these frequency generators are plugins which allows anyone to write a custom frequency plugin for use in a trading system.

See Also

Adding and Editing Frequencies

9.10.1 Adding and Editing Frequencies

Frequencies are plugin based. RightEdge ships with three frequency plugins. Time, tick and constant volume plugins.

When *Add* or *Edit* is clicked from the *Saved Frequencies* screen, the Frequency

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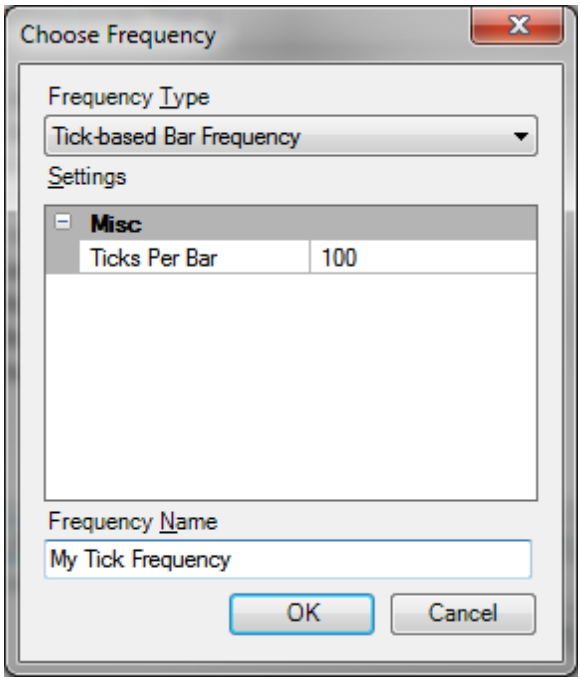
configuration screen is presented as shown below.



Frequency Type The frequency plugin using to generate this frequency

Settings Any settings that the frequency plugin provides to configure this frequency. These are provided by the plugin and are likely different based on the item selected in the *Frequency Type* drop down.

Frequency Name The "friendly name" given to this particular frequency configuration.

Note: Since frequencies are plugin based, more items may show in the Frequency Type drop down.

See Also

Managing Frequencies

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10 How Do I?

The *How Do I?* section is a task based section to help perform common functions within RightEdge.

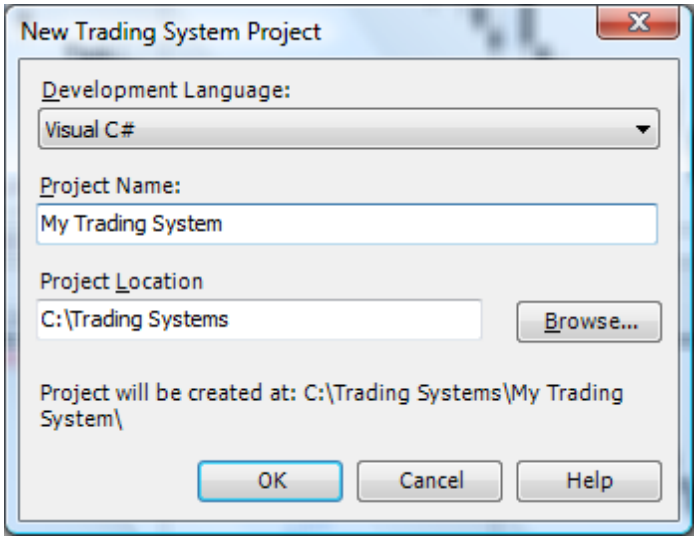
The sections available are:

- Configuring Services for data and broker providers
- Create a Trading System
- Debug a Trading System in Visual Studio
- Run a Backtest / Simulation
- Analyze Backtesting Results
- Optimize a Trading System
- Start Collecting Live Data
- Place Manual or Discretionary Trades
- View Live Charts
- Save Chart Settings
- Import Data from Other Software
- View Backtesting / Simulation Charts
- Set a Profit Target
- Set a Stop Loss
- Set a Time Based Order Timeout
- Collect Forex Data

Please click on any of the section links above to navigate to that topic.

10.1 Create a Trading System

To create a new system from scratch, select the ***Trading System...*** option from the ***File*** menu. The ***New Trading System Project*** window is displayed as shown below.



Development Language The current supported languages are Visual C# and Visual Basic.NET.

Note: If the planned usage for developing this system is strictly drag and drop then the

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language is essentially irrelevant.

Project Name This is the user defined name given to the trading system. This will also become the name of the project file.

Project Location Specifies the folder on the disk where this project folder and associated files will be saved.

Browse Click this button to browse for the desired project folder.

As each of the project items are changed in this dialog, the text at the bottom is updated to reflect the fully qualified directory of this project.

See Also

Using the RightEdge Environment
Trading System Pane
Live System Pane

10.2 Debug Trading Systems in Visual Studio

RightEdge provides access to industry standard languages. While the RightEdge IDE can be used to perform basic trading system development, you may also use industry standard tools such as Microsoft Visual Studio to create, build and debug trading systems for use with RightEdge.

RightEdge strategies are compiled to standard .NET assemblies (DLLs). There are a number of ways to begin debugging using Visual Studio. If the trading system is already running, you can load up Visual Studio and use the "Attach To Process" option. This option is located under the Debug menu. A project must already be loaded.

Note: If you're using the Express editions of Visual Studio, the "Attach To Process" option is not available.

You may also create a project from the RightEdge IDE. To do this, load your trading system in RightEdge. Under the *System* menu select *Visual Studio*, *Create VS Project*. The name of your system with the appropriate Visual Studio project extension will be placed in your trading system's folder. You can open this project using Visual Studio.

To begin debugging, follow these steps.

1. If RightEdge is open, close RightEdge.
2. Open Visual Studio and open the trading system project.
3. Right click on your project in Visual Studio and select *Properties*.
4. Click the Debug tab.
5. Under Start Action, select *Start External Program* and navigate to the RightEdge executable.
6. Open your trading system file in Visual Studio and set your desired breakpoints.
7. Hit F5 to begin debugging. This should launch RightEdge.
8. Open your trading system project in RightEdge and begin either a simulation or live system run.

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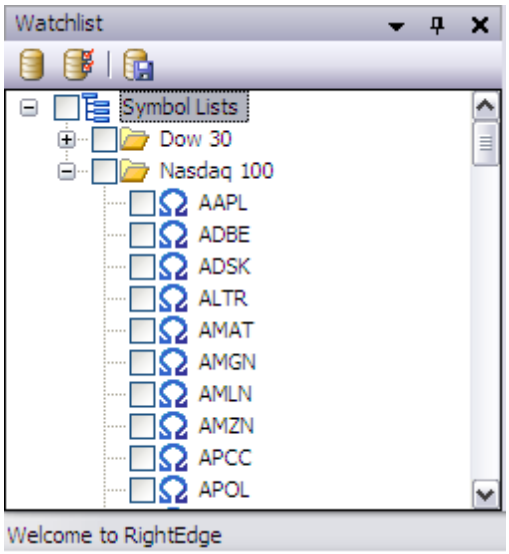
At this point, your breakpoints should be triggered. If the breakpoints are a solid red dot, the library is loaded and active. If the breakpoints are a hollow dot, the system is not properly setup for debugging. One common cause is missing program debug information. Make sure that program debug information is begin produced. The file extension of the program debug database that Visual Studio uses is .pdb. This should reside in the same location as your trading system assembly.

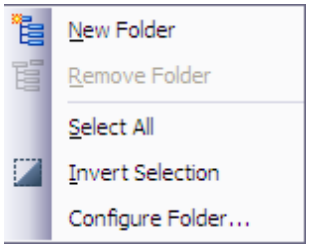
10.3 Setup A Watchlist

Watchlists indicate what symbol or grouping of symbols are going to be used for backtesting, downloading historical data, collecting live data or running a system. These can be configured at the user's discretion. Services have to be configure before you are able to download historical data or collect live data. See the Configuring Services section if you have not configured services.

Once the service is configured, the next step is to assign this service to a group of symbols.



RightEdge ships with a couple of default folders already configured. The two symbol folders are the Nasdaq 100 and Dow 30. Right click on the top level node or any folder underneath and select ***Configure Folder...***



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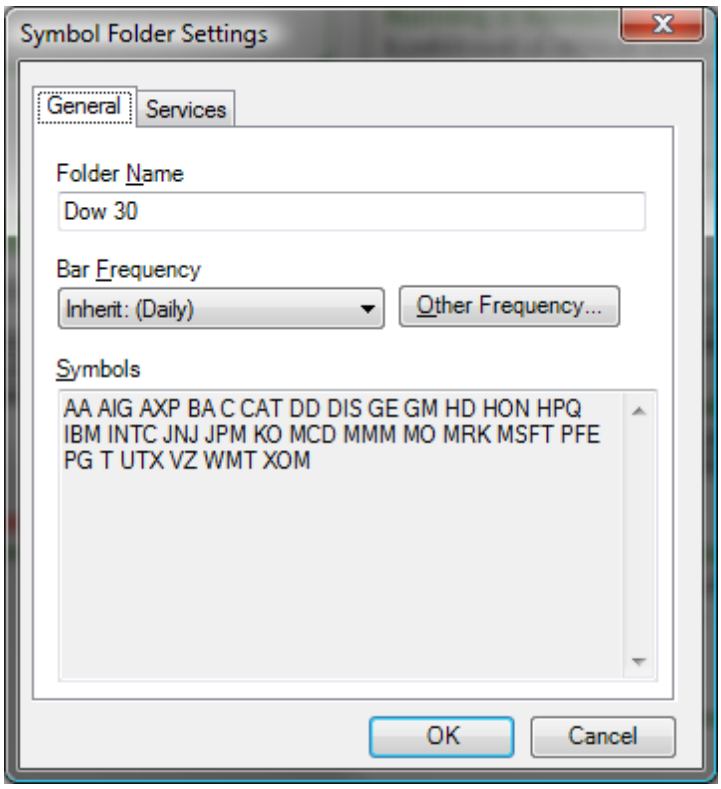

The Dow 30 folder contains the list of symbols that are contained within this folder. Folders can contain any number of symbols, the only requirement is that they're all the same frequency (i.e. daily, weekly, 5 minutes, 1 minute, etc). This is set (or inherited) in the ***General*** tab.

Items added or removed from ***Symbols*** field with be added or removed from the folder and subsequently the user interface.

Click the ***Services*** tab to assign a service to this folder.

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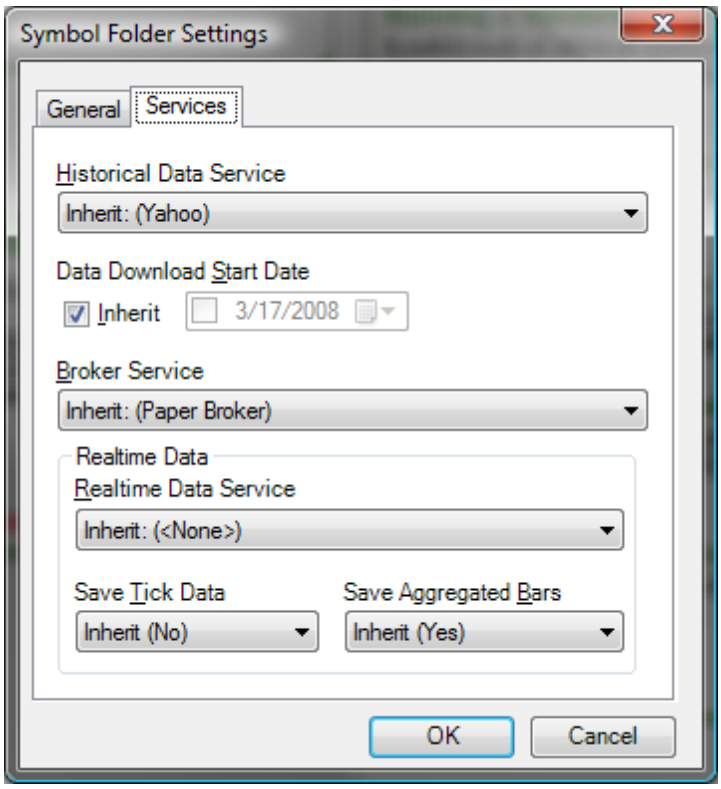

As previously mentioned, RightEdge ships with a predefined historical data plugin for Yahoo. This service is configured with the name "Historical". "Historical" shows up in the list and is currently assigned to the Dow 30 folder. For the case of historical data plugins, it is possible to set a start date at which historical data is retrieved. For example, GE contains nearly 50 years of historical data on Yahoo. It may not be necessary to retrieve this much data. Select the ***Data Download Start Date*** to limit this data collection.

Broker and real time data services will also be assigned here.

Inheriting Folder Settings

By default, folder settings are setup to *inherit*. Inheritance is a powerful time saving feature where you can set a parent folder with specific information such as service selections, data saving selections and frequencies and allow folders that appear underneath the parent folder to use those settings. This saves time since each folder does not have to be explicitly setup.

See Also

Getting Started
Start Collecting Live Data
Starting a Live System
Charting

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10.4 Configure a Service

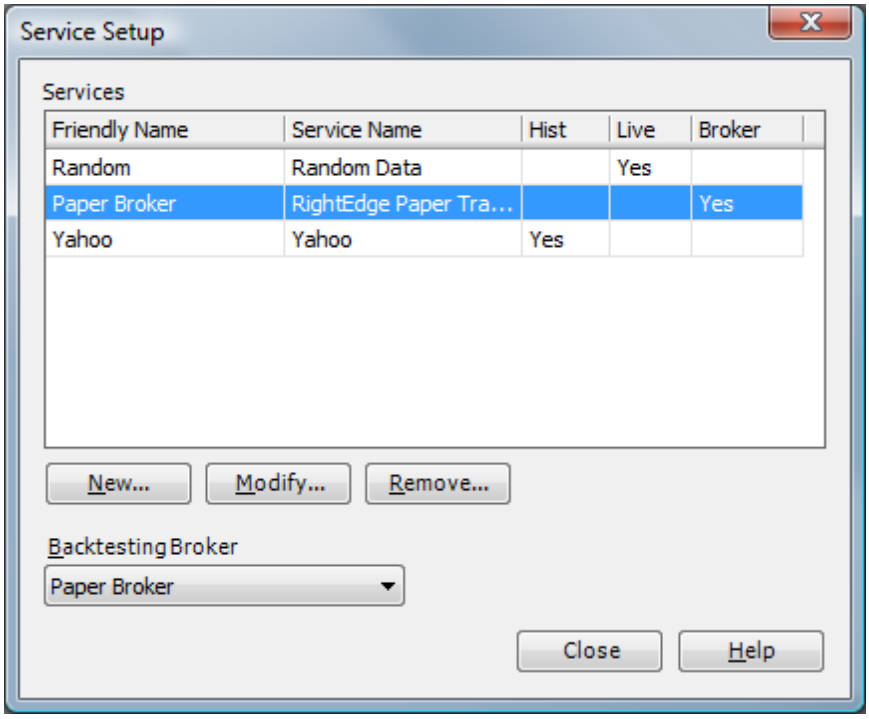
A ***service*** is a type of plugin that may supporting retrieving realtime data, retrieving historical data, or connecting to a broker. Services are associated with symbols in the Watchlist pane. You can set up a hierarchical folder structure and have child folders inherit settings from their parents (or override those settings).

Simply put, this is how to retrieve and act on data.

RightEdge provides a simple, yet robust means of organizing not only data, but the means in which data is acted upon. Services are configured at a global level, yet they are assigned at a group level and can be optionally inherited down the tree.

First, the services must be configured.

Select the ***Configure Services...*** menu item from ***Tools*** menu.



RightEdge comes default with a predefined service for Yahoo and it is named "Historical". The Service Setup list will show the capabilities of a configured server. Since some plugins support more than one piece of functionality, this is the place to determine the available functionality for each plugin and whether or not it is currently configured to use.

In this case, the Yahoo service has the ability to retrieve historical data. It does not have the ability to retrieve live data, nor does it provide broker services.

To add a new service, click the ***New...*** button. A wizard prompting for information that this service needs will follow. Upon the completion of the wizard steps, the service will appear in the list.

Assigning Services

Setting up a service is the first step in realizing the functionality of the service. The next

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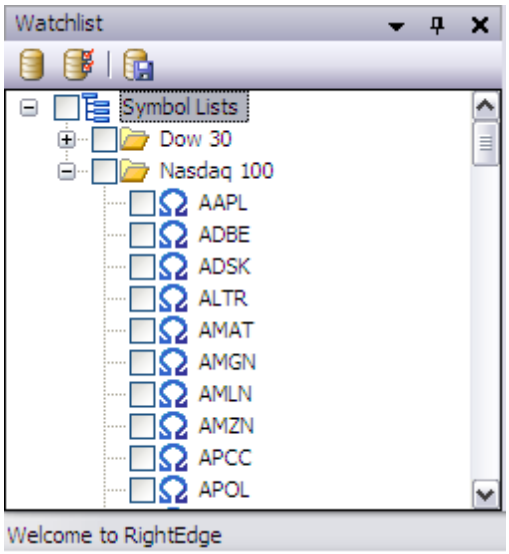
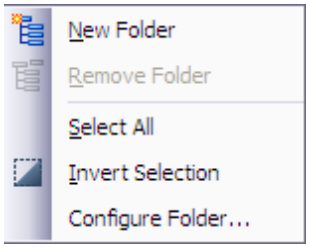
step is to assign this service to a group of symbols.



RightEdge ships with a couple of default folders already configured. The two symbol folders are the Nasdaq 100 and Dow 30. Right click on the top level node or any folder underneath and select ***Configure Folder...***



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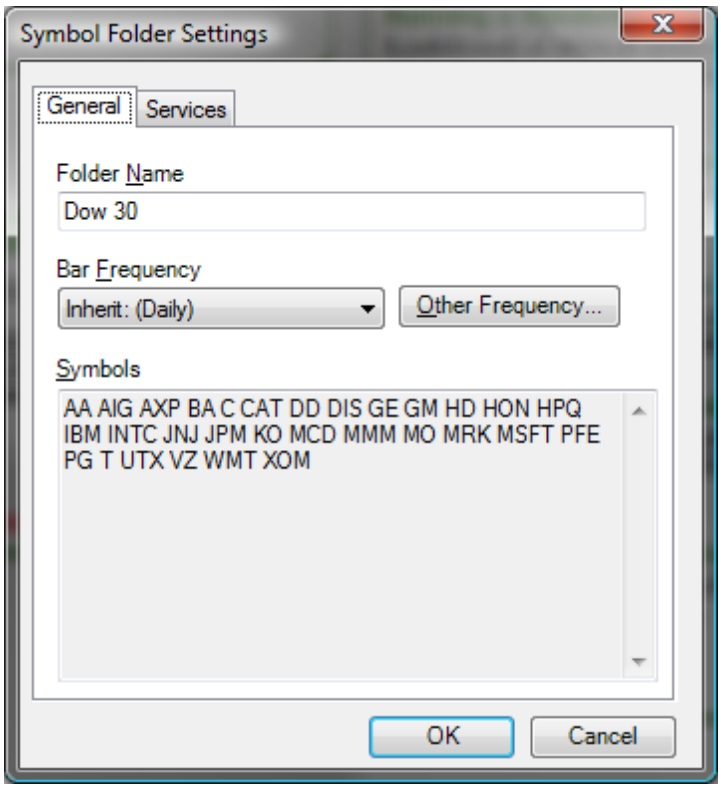

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Items added or removed from ***Symbols*** field with be added or removed from the folder and subsequently the user interface.

Click the ***Services*** tab to assign a service to this folder.

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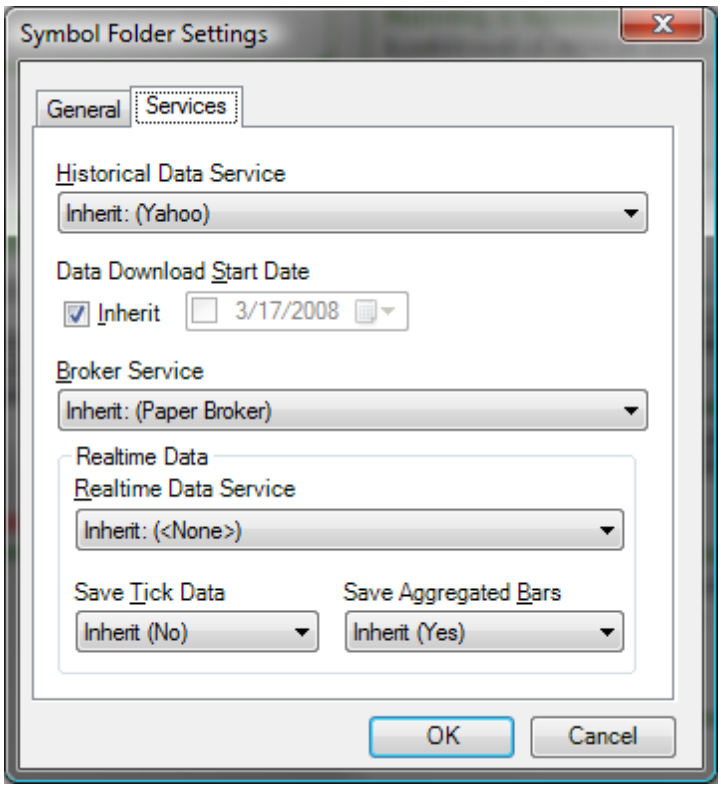

As previously mentioned, RightEdge ships with a predefined historical data plugin for Yahoo. This service is configured with the name "Historical". "Historical" shows up in the list and is currently assigned to the Dow 30 folder. For the case of historical data plugins, it is possible to set a start date at which historical data is retrieved. For example, GE contains nearly 50 years of historical data on Yahoo. It may not be necessary to retrieve this much data. Select the ***Data Download Start Date*** to limit this data collection.

Broker and real time data services will also be assigned here.

For software developers interested in developing service plugins, please visit the Service & Plugin Overview section.

See Also

Modifying Services

10.5 Run a Backtest / Simulation

This help topic provides a very high level overview of back testing within RightEdge.

Open a trading system using the ***Open Trading System...*** option from the ***File*** menu. If you do not have a trading system, see the Create New Trading System topic. You can also download existing trading systems from the RightEdge website.

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Once a trading system is opened, select the symbols on the Watchlist pane to run this system against. If you have not configured a watchlist, see the Setup a Watchlist section before continuing.

Now that the symbols are selected, select ***Run Backtest*** from the ***System*** menu. If there are no errors in the system, the simulation will complete and the system results screen is displayed.

For details on reviewing and interpreting the system results screen, see the Analyzing System Results section.

For details on running a system with optimization parameters, see the Optimization Overview section.

See Also

Charting
Backtesting (definition)
Getting Started

10.6 Optimize a System

Optimization is used to test a system with certain variables changed across simulation runs. Running the system with variable parameters or optimization parameters allows the system developer to determine which values result in the most favorable system performance.

Any value in the system can be used as an optimization value. Technical indicators are usually the first candidates since many accept a number of numeric inputs. Other items such as profit targets and stop loss values are also viable candidates.

To begin using optimization in RightEdge, a trading system must be open. In the Project Properties, locate the ***System Parameters*** property.

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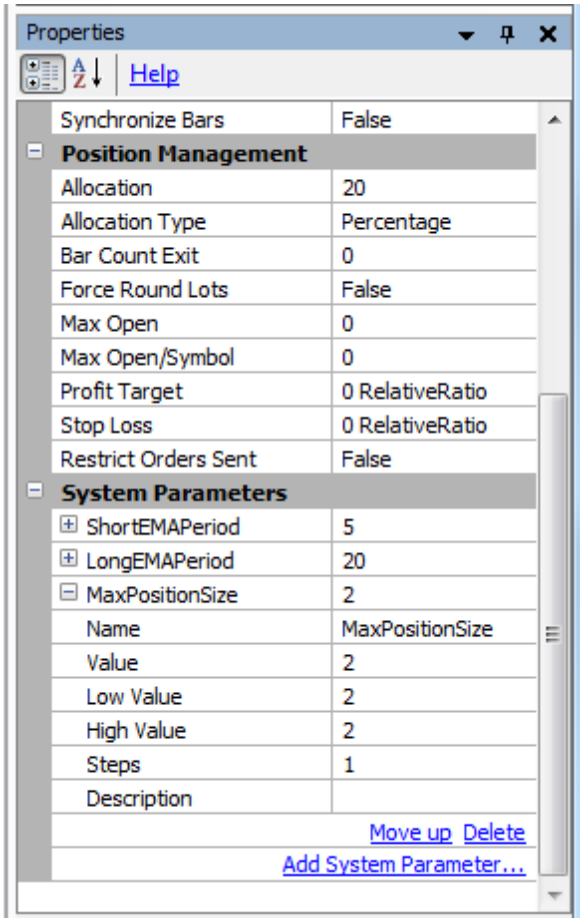

RightEdge supports any number of parameters in this list. Each value is treated as a type of double. Click the ***Add*** button to add a new empty parameter. Use the property grid on the right to name this parameter and assign a default value.

Referencing Parameters

Once optimization parameters have been added to the project, they may be referenced in code. Using the above parameter, stochBuyValue, we will only perform a buy if the StochK indicator is below our optimization parameter.

C#

```
if (stochKValue < SystemParameters["stochBuyValue"])
{
    // Perform buy here.
}
```

Visual Basic

```
If (stochKValue < SystemParameters.Item("stochBuyValue")) Then
    ' Perform buy here.
End If
```

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See Also

Optimization Dialog
Optimization Output
Automating RightEdge

10.7 View Live Charts

This help topic provides guidance on opening charts containing indicators and chart objects are being generated during the collection of live data or while a live system is running.

To see charts with indicators and chart objects that are being created by a currently running live system you should not open them from the watchlist. Opening a chart by double clicking on the symbol from the watchlist will always open a raw chart, showing only bar data. We do this for a few reasons.

- It is good to have a place where you can always get a clear, uncluttered, view of the bar data for a symbol.
- Since RightEdge allows multiple sets of symbol results to be open at one time and there are we'd have no easy way to know which set of system results to use to plot indicators and chart object.

When you start a live system the Live Data window will be populated with a list of all symbols for which data is being collected. Double clicking on any of these symbols will bring a live chart.

Live Data

Symbol	Bid	Bid Size	Ask	Ask Size	Last Volume	Last Price
AAPL	0.00	0	0.00	0	6302	30.07
ADBE	0.00	0	0.00	0	3964	30.00
ADSK	0.00	0	0.00	0	5766	30.10
ALTR	0.00	0	0.00	0	6933	30.00
AMAT	0.00	0	0.00	0	631	30.03

See Also

Charting Overview

10.8 View System Charts

This help topic provides guidance on opening charts containing indicators and chart objects that were generated during a simulation.

To see charts with indicators and chart objects that were created by a system you should not open them from the watchlist. Opening a chart by double clicking on the symbol from the watchlist will always open a raw chart, showing only bar data. We do this for a few reasons.

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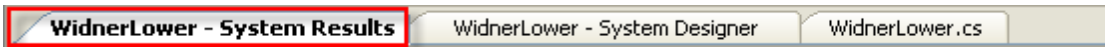
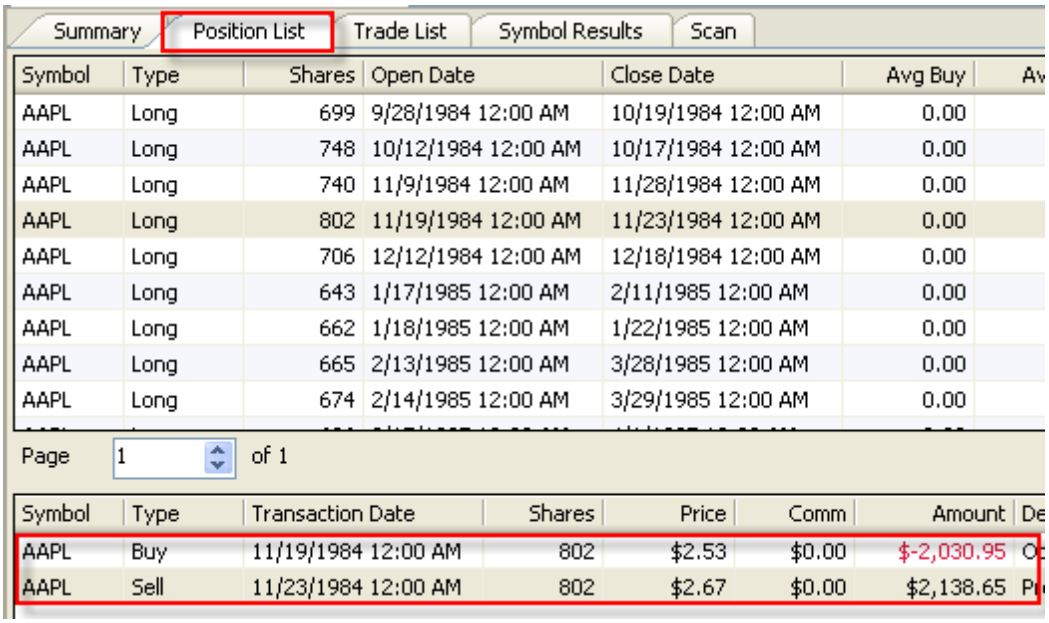
- It is good to have a place where you can always get a clear, uncluttered, view of the bar data for a symbol.
- Since RightEdge allows multiple sets of symbol results to be open at one time we'd have no easy way to know which set of system results to use to plot indicators and chart object.

After you create a system and run it against a group of symbols a "System Results" tab will be created in your workspace.



From here, you can select one of the following tabs

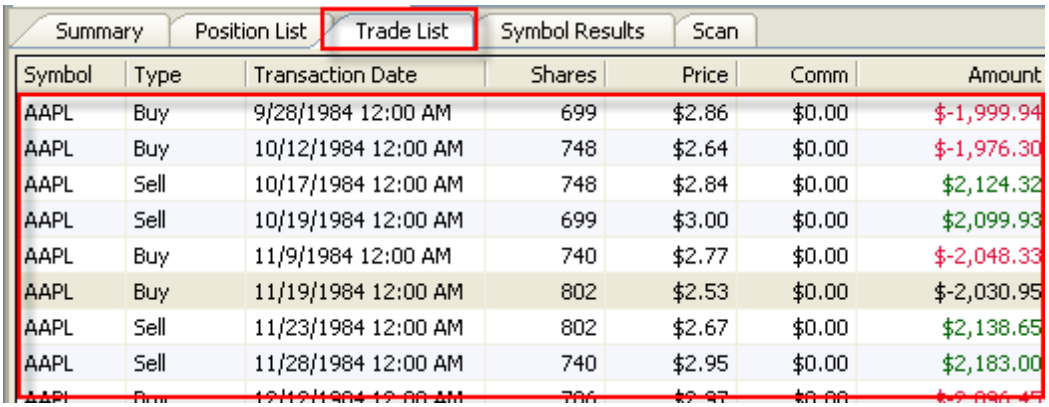
On the Position List tab, selecing a position on the top pane will display a list of trades within that position on the lower tab. Double clicking on any of the trades will open a system chart and bring you to the position of that trade.



Symbol	Type	Shares	Open Date	Close Date	Avg Buy
AAPL	Long	699	9/28/1984 12:00 AM	10/19/1984 12:00 AM	0.00
AAPL	Long	748	10/12/1984 12:00 AM	10/17/1984 12:00 AM	0.00
AAPL	Long	740	11/9/1984 12:00 AM	11/28/1984 12:00 AM	0.00
AAPL	Long	802	11/19/1984 12:00 AM	11/23/1984 12:00 AM	0.00
AAPL	Long	706	12/12/1984 12:00 AM	12/18/1984 12:00 AM	0.00
AAPL	Long	643	1/17/1985 12:00 AM	2/11/1985 12:00 AM	0.00
AAPL	Long	662	1/18/1985 12:00 AM	1/22/1985 12:00 AM	0.00
AAPL	Long	665	2/13/1985 12:00 AM	3/28/1985 12:00 AM	0.00
AAPL	Long	674	2/14/1985 12:00 AM	3/29/1985 12:00 AM	0.00

Symbol	Type	Transaction Date	Shares	Price	Comm	Amount
AAPL	Buy	11/19/1984 12:00 AM	802	$2.53	$0.00	$-2,030.95
AAPL	Sell	11/23/1984 12:00 AM	802	$2.67	$0.00	$2,138.65

On the Trade List tab, double clicking any of the trades will open a system chart and bring you to the position of that trade.



Symbol	Type	Transaction Date	Shares	Price	Comm	Amount
AAPL	Buy	9/28/1984 12:00 AM	699	$2.86	$0.00	$-1,999.94
AAPL	Buy	10/12/1984 12:00 AM	748	$2.64	$0.00	$-1,976.30
AAPL	Sell	10/17/1984 12:00 AM	748	$2.84	$0.00	$2,124.32
AAPL	Sell	10/19/1984 12:00 AM	699	$3.00	$0.00	$2,099.93
AAPL	Buy	11/9/1984 12:00 AM	740	$2.77	$0.00	$-2,048.33
AAPL	Buy	11/19/1984 12:00 AM	802	$2.53	$0.00	$-2,030.95
AAPL	Sell	11/23/1984 12:00 AM	802	$2.67	$0.00	$2,138.65
AAPL	Sell	11/28/1984 12:00 AM	740	$2.95	$0.00	$2,183.00

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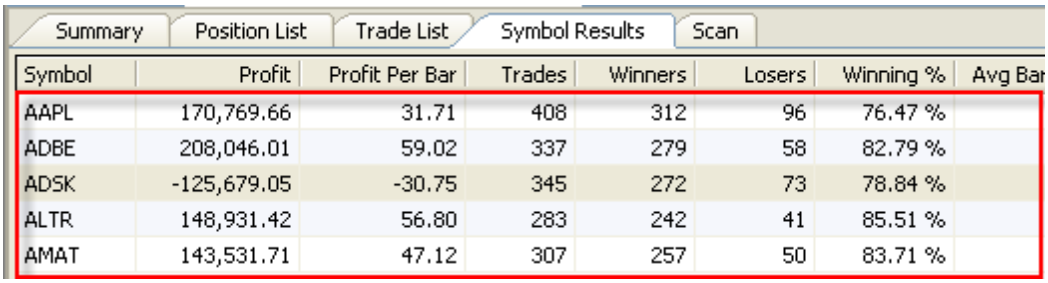
On the Symbol Results tab , double clicking any symbol will open a system chart for that symbol.



Symbol	Profit	Profit Per Bar	Trades	Winners	Losers	Winning %	Avg Bar
AAPL	170,769.66	31.71	408	312	96	76.47 %	
ADBE	208,046.01	59.02	337	279	58	82.79 %	
ADSK	-125,679.05	-30.75	345	272	73	78.84 %	
ALTR	148,931.42	56.80	283	242	41	85.51 %	
AMAT	143,531.71	47.12	307	257	50	83.71 %	

See Also

Charting Overview

10.9 Start Live Trading System

This help topic provides a very high level overview of back testing within RightEdge. It is assumed that you have already configured a live data service, a Watchlist and created or downloaded a trading system to run. If not, please follow the links below.

Configuring Services
Setup a WatchList
Create New Trading System

Open a trading system using the ***Open Trading System...*** option from the ***File*** menu. If you do not have a trading system, see the Create New Trading System topic. You can also download existing trading systems from the RightEdge website.

Once a trading system is opened, select the symbols on the Watchlist pane to run this system against. If you have not configured a watchlist, see the Setup a Watchlist section before continuing.

Now that the symbols are selected, select ***Run Live*** from the ***Build*** menu. If there are no errors in the system, the system will begin running.

The system also starts live data for the specified symbols. See Live Data pane for more information. **Double click a symbol in the live data pane to open a live chart into the document area.**

The Live System pane will contain information about positions, P/L, etc.

To stop a live system, select the ***Stop Live*** option from the ***Build*** menu.

See Also

Using the RightEdge Environment
Setup a Watchlist
Configure Services
Capturing Live Data
Charting Overview

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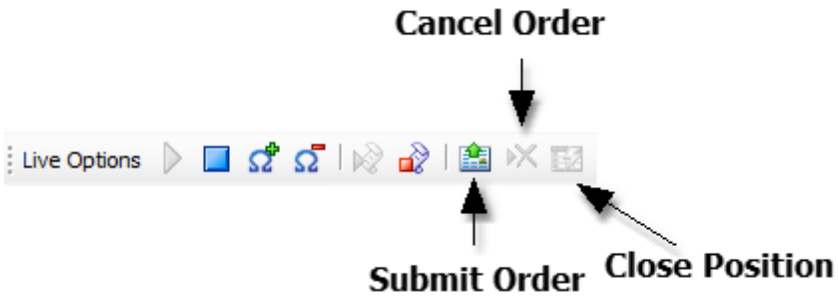
10.10 Manual or Discretionary Trading

Most of the time it is desirable to have your system do all of the trading for you. In rare cases, however, it may be necessary to place opening orders, close existing positions or cancel existing orders. For this purpose, RightEdge provides some basic discretionary trading features while a live system is running.

The discretionary features can be found in the "Live Options" toolbar.



These items are available when a live system is currently running and accepting trades. Submitting a new order is always available. When this button is clicked, the *Submit Order* screen is presented which accepts the parameters to open a new position. For more information please see the Submit Order help topic.

Cancel Order is enabled when an existing order is selected in the *Pending Orders* grid in the *Live System* pane. The currently selected order will have a cancel request submitted to the broker when clicked.

Close Position is enabled when an existing position is selected from the *Open Positions* tab in the *Live System* pane. An order will be sent to the broker to close the currently selected position in its entirety.

Note: These orders are routed directly to broker that is associated with the running trading system. All orders will be submitted immediately. Use with great caution and care.

Note: These items are also accessible by right clicking within the corresponding tabs in the Live System pane.

10.11 Import Data

Use Import Data tool to import data from a text file into a Watchlist folder. The Import Data tool examines the text file that you are importing and helps you ensure that the data is imported in the way that you want. You can import multiple files with the same import settings at one time.

To begin the process, select ***Import Bar and Tick Data...*** from the ***Tools*** menu.

- Files Tab

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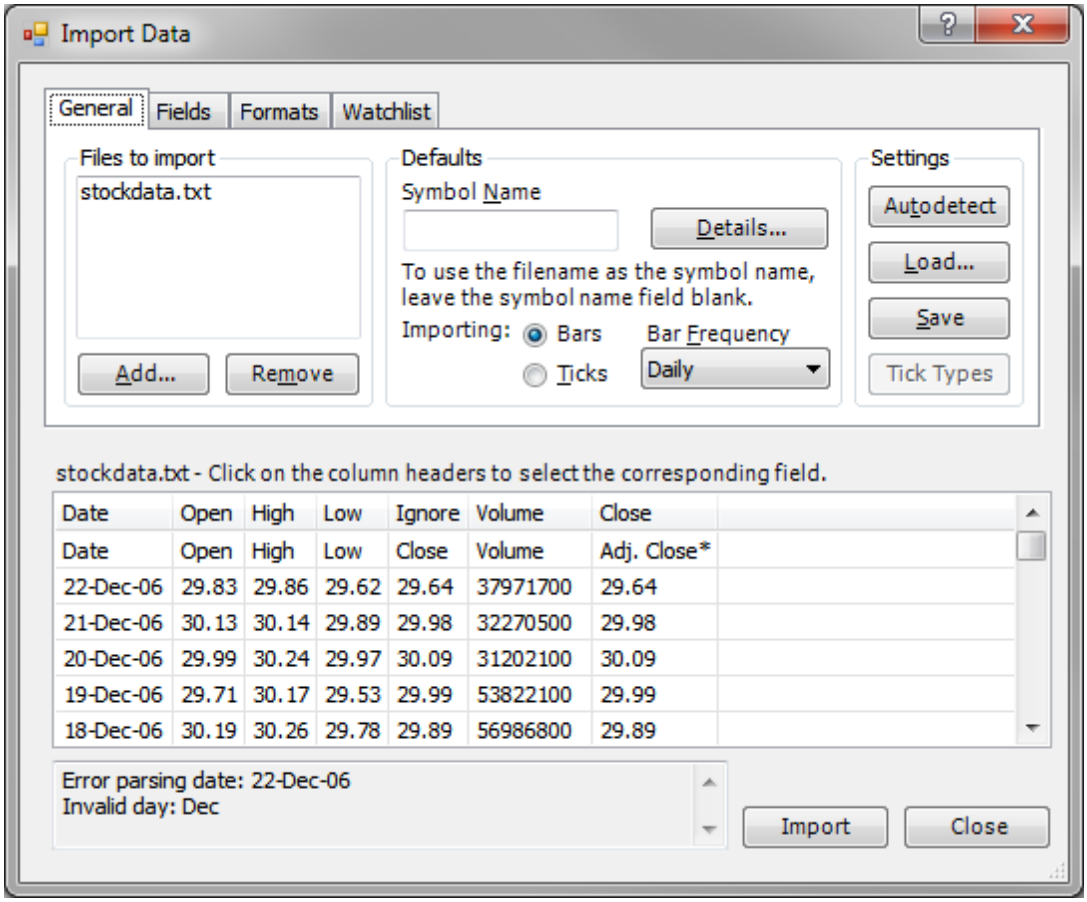
- Fields Tab
- Formats Tab
- Watchlist Tab

Files Tab

Use the Files tab to select one or more files to import.

Click the ***Add...*** button to display a file dialog that will allow for multiple selection.

Note: Hold the Ctrl in the file dialog to select more than one file.



The ***Remove*** button is used to remove a file that currently exists in the list.

At this point, the fields for the file that will be imported may or may not contain column definitions. If a heading exists in the imported file, RightEdge will try its best to determine what column maps to what. RightEdge also attempts to auto-detect the delimiter (tab, comma, etc).

Import Settings

Clicking the ***Load...*** button will allow for retrieval of previously saved field settings. The Save button allows the currently set fields to be saved to disk for later use. This is particularly useful if the same file is parsed on a regular basis.

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Autodetect Click this button to force RightEdge to auto-detect the columns within the file.

Symbol Name Specify the name of the symbol as it will appear in the Watchlist.

Details Allows additional information to be set for this symbol. For example, if this is a futures contract, set the expiration date in the symbol details screen.

Bars or Ticks Specifies whether this data file contains bar or tick data.

Bar Frequency Specifies the frequency of the imported data.

Tick Types Select this item to map tick types to the data file. RightEdge supports bid, ask and last tick types.

Fields Tab

If the field definitions are not retrieved from disk, it will be necessary to

specify them manually. These can be specified regardless of the tab selected by simply clicking the header of the sample data shown in the output window. In this particular case, it was necessary to select the proper delimiter. This file is comma delimited, therefore, we have select the ***Comma*** checkbox.

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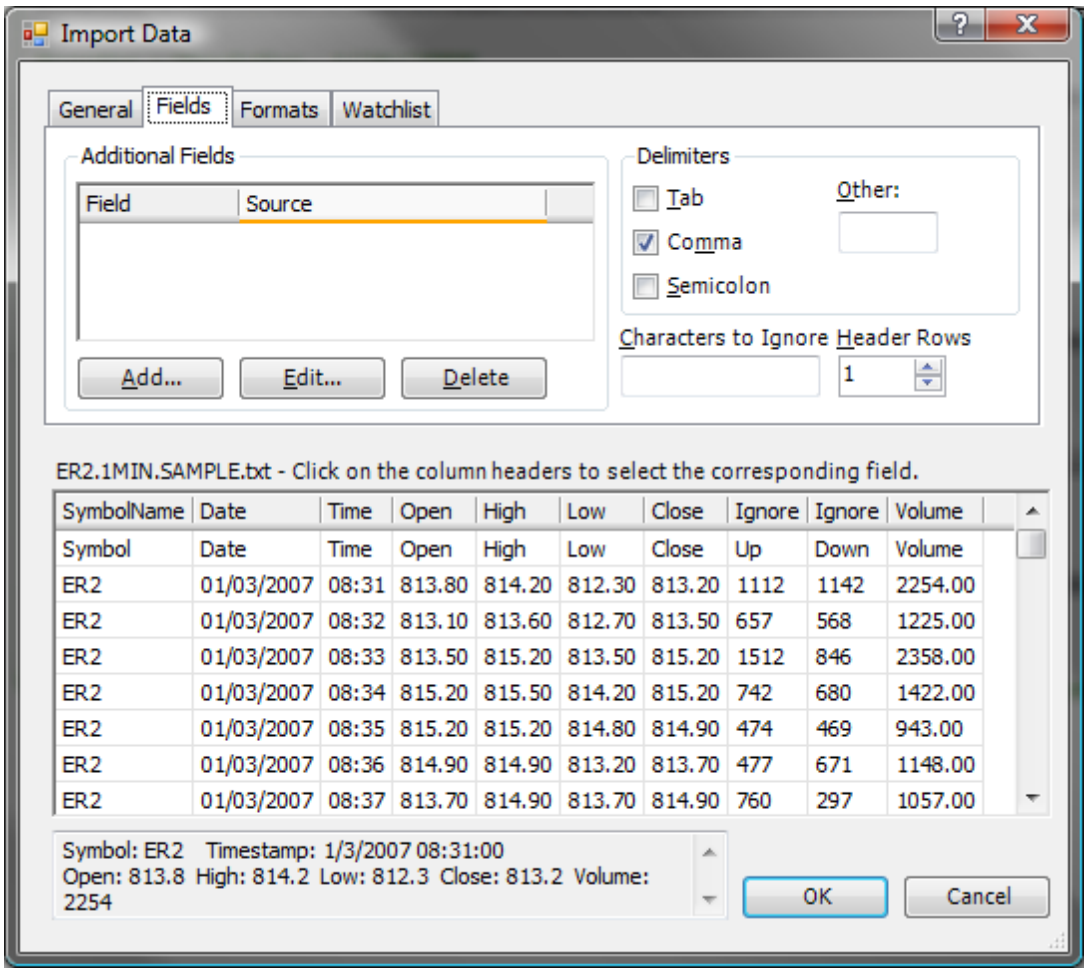
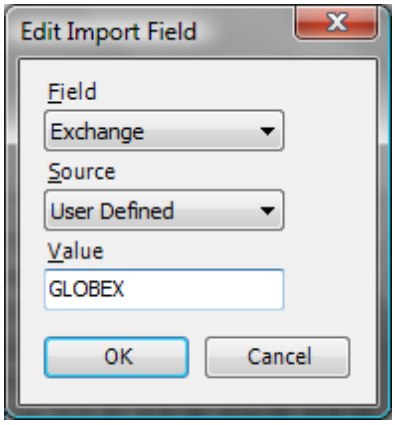

Import Data
General
Fields
Formats
Watchlist
Additional Fields
Field
Source
Add...
Edit...
Delete
Delimiters
Tab
Comma
Semicolon
Other:
Characters to Ignore
Header Rows
1
ER2.1MIN.SAMPLE.txt - Click on the column headers to select the corresponding field.
SymbolName Date Time Open High Low Close Ignore Ignore Volume
Symbol Date Time Open High Low Close Up Down Volume
ER2 01/03/2007 08:31 813.80 814.20 812.30 813.20 1112 1142 2254.00
ER2 01/03/2007 08:32 813.10 813.60 812.70 813.50 657 568 1225.00
ER2 01/03/2007 08:33 813.50 815.20 813.50 815.20 1512 846 2358.00
ER2 01/03/2007 08:34 815.20 815.50 814.20 815.20 742 680 1422.00
ER2 01/03/2007 08:35 815.20 815.20 814.80 814.90 474 469 943.00
ER2 01/03/2007 08:36 814.90 814.90 813.20 813.70 477 671 1148.00
ER2 01/03/2007 08:37 813.70 814.90 813.70 814.90 760 297 1057.00
Symbol: ER2 Timestamp: 1/3/2007 08:31:00
Open: 813.8 High: 814.2 Low: 812.3 Close: 813.2 Volume: 2254
OK
Cancel

Additional Fields

Additional fields are used to define fields that are not actually contained within a line of data. In other words, these are data fields that are not seen within the output window. A sample of this might be a symbol name or an exchange.



For example, if the exchange is not listed within the data file, the exchange can become a user defined value that is set with each row. Another source that may be used is the filename itself. Some data streams may put information about the data in the filename.

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Click the ***Add...*** button to define a new import field. Click the ***Edit...*** button to modify the settings of an existing user defined import field. Click the ***Delete...*** button to remove the user defined import field from the list.

Select the way the month is formatted in the data file. M represents a 1 or 2 digit month value. MM represents a month value that is always 2 digits.

Delimiter

Comma and/or ***Tab*** and /or ***Semicolon*** are common delimiters. If the file is not comma, semicolon or tab separated, uncheck all of the delimiter checkboxes and type the delimiter into the ***Other*** field.

Characters to Ignore

Each character entered into this field will be stripped before being placed into the data store. Enter one or more characters here.

Note: Enter each character without a delimiter as each character is treated independently.

Header Rows

Many data files contain one or more rows at the beginning of the file to give information about the row contents. It is likely necessary that these lines will need to be skipped for the importer. Specify the number of lines to skip at the beginning of the file.

Formats Tab

The formats tab is used to define the date and time elements and how they're

comprised.

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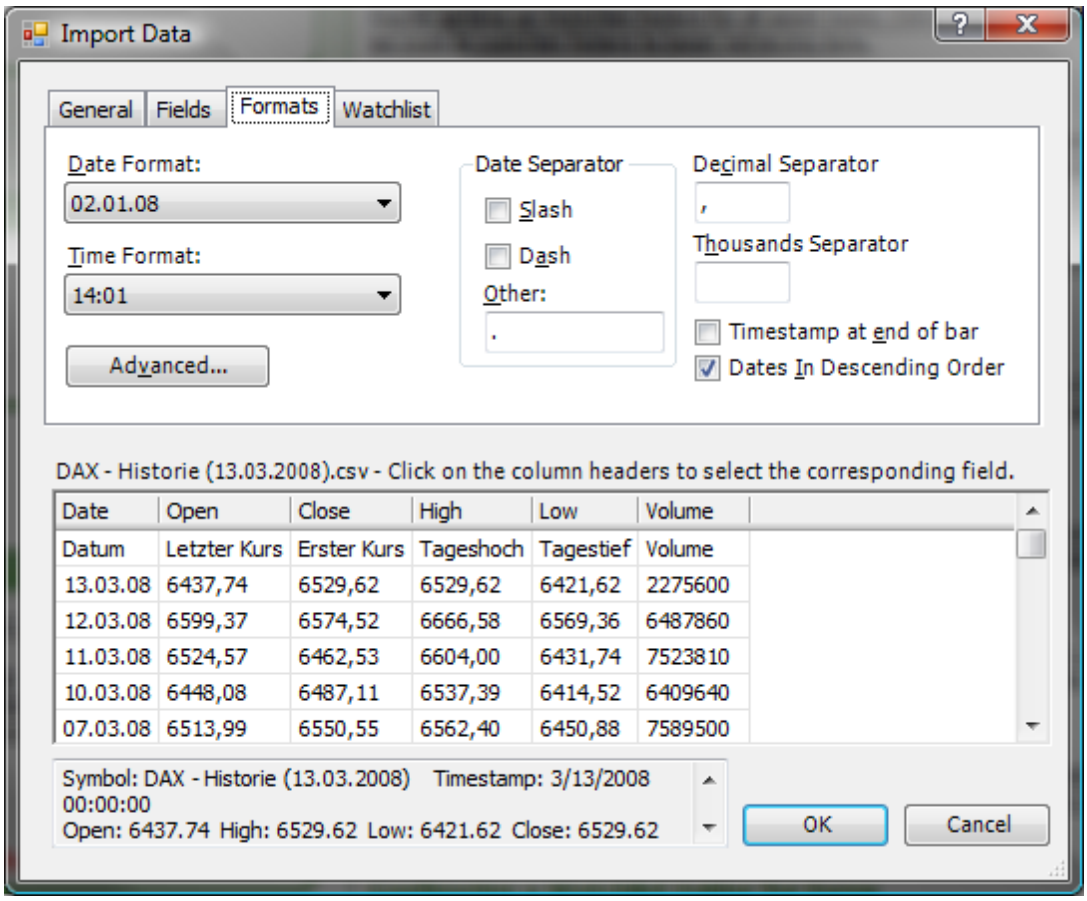

Date Format

This dropdown contains a list of common date formats.

Time Format

This dropdown contains a list of common time formats.

Date Separator

Dash and/or ***Slash*** are common delimiters. If the date is not slash or dash separated, uncheck both Dash and Slash and type the delimiter into the ***Other*** field.

Decimal Separator

Specify the character that is used to indicate a decimal value.

Thousands Separator

Specify the character that is used to indicate a thousands separator.

Timestamp at end of bar

Indicates that the time value encountered is when the bar is ending. By default, RightEdge assumes that the timestamp in the imported file indicates the beginning of the bar.

Dates in descending order

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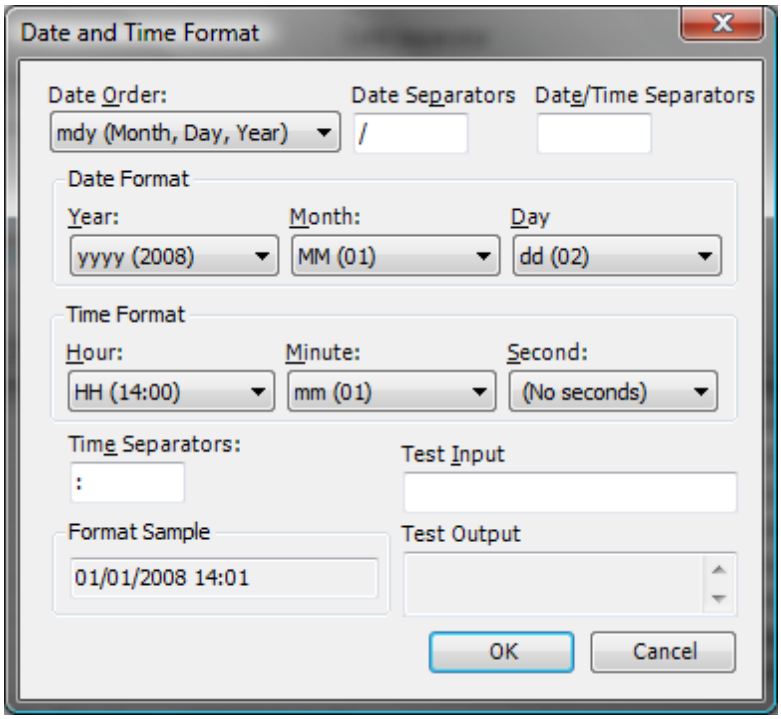
By default, RightEdge expects the dates of each bar to appear in ascending order. Select this option to reverse this.

Advanced

Click this button to specify the date and time elements independently.



Date Order

Specifies the order in which the date elements appear.

Date Separators

Enter one or more characters used to split the date elements. This is used for dates only.

Date/Time Separators

Enter one or more characters used to split the date and time elements. This is used when the date and time is specified in the same column.

The time and date formats are shown below.

Date format notation

yyyy = 2007 yy = 07 yyy = 107

M = 1 MM = 01 MMM = Jan MMMM=January

d = 1 dd = 01

Time format notation

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h = hour m = minute s = second t = am or pm

h = 12 hour

H = 24 hour

hh, mm, ss = leading zero

h, m, s = no leading zero

Time Separators

Enter one or more characters used to split the time elements. This is used for time only.

Test Input

Enter in a test line of data here to test the current selections in the date and time drop downs. The output will be displayed in the ***Test Output*** field.

Format Sample

The importer will generate a sample line based on the current drop down selections. This sample is displayed here.

Watchlist Tab

RightEdge now has enough information to begin mapping the data within each

column.

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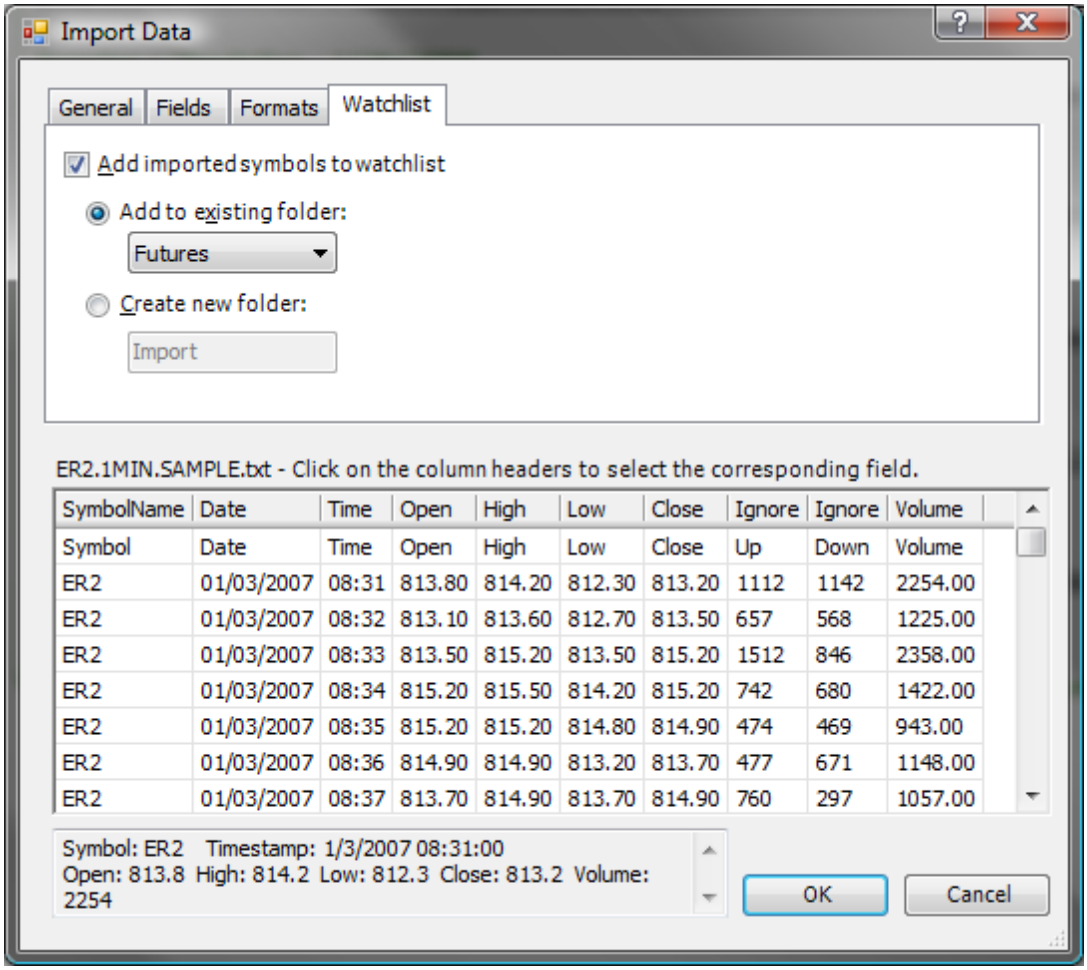

The importer will allow the symbols to be created within an existing symbol folder within the watchlist or allow for a new folder to be created.

Add imported symbols to watchlist

Check this box to import the symbols and the associated data directly into the watchlist.

Add to existing folder

Specifies that the symbol and associated data will be imported to an existing folder within the watchlist. Select the desired name from the dropdown.

Create new folder

Specifies that the symbol and associated data will be imported to a new folder name specified.

See Also

Bar Data Cleanup

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10.11.1 Bar Data Cleanup

The bar data cleanup utility is used to identify problems with bar data. The utility looks for:

- Bar timestamps that are not rounded to the correct frequency. An example of this would be 5 minute bars where the timestamps would be precisely every 5 minutes. If one or more bar timestamps does not fall precisely on this boundary, RightEdge will flag it as a bar timestamp not rounded based on bar frequency.
- Duplicate bars for the same timestamp. If two or more bars contain the exact same timestamp, this will be logged as a problem.
- Duplicate bars after rounding for the same timestamp. If a bar is out of the frequency boundaries, it would be rounded, however, this rounding may create a collision with another bar. This will be flagged as an issue.

When issues are found within the bar data, the symbol, frequency, timestamp and price data are all displayed in the clean up list. You may use the Bar Data Editor to fix these problems manually or click the *Autofix All* button to allow RightEdge to make an attempt to fix these problems automatically.

See Also

Import Data
Bar Data Editor

10.12 Analyze Simulation Results

The System Results screen contains a great deal of information and also a great deal of flexibility when deciding how to utilize the information. This topic will deal with interpreting the information as well as managing it for your needs with features such as exporting and printing. This section is broken up into two main areas. The first area describes the functionality presented within the system results and the second area goes into detail about the information that is presented.

1. Manipulating System Results
2. Interpreting System Results
   a. Summary
   b. System Parameters
   c. Position List
   d. Trade List
   e. Symbol Results
   f. Scan
   g. Charts

Manipulating System Results

When a simulation has completed, the system results are displayed in the document area of RightEdge. The System Results document contains multiple tabs each assessing

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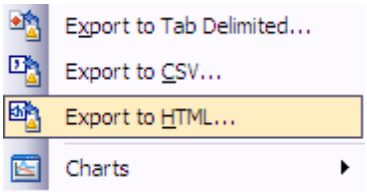
different aspects of the simulation.

System Results tabs are external plugins that can be toggled on and off. See the System Results screen documentation for more information on loading plugins from third parties and toggling existing system result screens on and off.

Each tab contains features that are common. These features can be accessed using a combination of items on the context menus and items in the main menu. The statistics windows, which are those windows that contain textual information as opposed to graphical information, have ability to export to common formats as well as print.

When a grid is displayed, right click on the grid area.



This context menu will allow for exporting. Supported formats are tab delimited, CSV (common separated) and HTML. This menu also facilitates displaying system results charts that are not displayed by default. For more information on configuring system results default charts, see System Results Options.

Each of the grids can also be printed. Select the desired tab and select ***Print...*** from the ***File*** menu.

The grids columns for the Trade List, Symbols Results and Scan tabs can also be manipulated and sorted. To sort, click any of the column headings. Click once to sort ascending and click the same column again to sort descending. To move a grid column into another position, click the column heading and hold the left mouse button down. Drag the column to the desired location and release the mouse button.

Interpreting System Results

Each tab represents the results of the simulation. The textual versions of the result breakdowns are in the first four tabs titled Summary, Trade List, Symbol Results and Scan. Click any of the areas to retrieve more information.

Summary

The summary tab contains a list of totals broken down horizontally into all trades (long & short combined), long only trades, short only trades and buy and hold. The vertical breakdown groups information about this simulation into manageable categories.

Capital Summary

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Starting Capital	The amount of capital set in the simulation to begin with.
Ending Capital	The total amount of capital that is in the account after all trades are placed. This will include the starting capital.
Net Profit ($)	The total amount of profit or loss represented as currency.
Net Profit (%)	The total amount of profit or less represented as a percentage against the starting capital.
APR	The calculated annual percentage return of the profit or loss.
Exposure	The average exposure of capital to the market.

System Totals

Number of Trades	The total number of trades the simulation opened.
Maximum Profit	The highest profit achieved for all trades in the group.
Maximum Loss	The largest loss encountered over all trades in the group.
Average Profit ($)	The average profit from a currency standpoint over all trades in the group.
Average Profit (%)	The average profit from a percentage standpoint over all trades in the group.
Average Bars Held	The average number of periods that a position was held over all trades in the group.
Maximum Exposure	The maximum value exposed to the market represented as currency.
Max Exposure (%)	The maximum value exposed to the market represented as a percentage.
Max Exposure Date	The date when the maximum currency exposure occurred.
Max Exposure (%) Date	The date when the maximum percentage exposure occurred.
Max Drawdown ($)	The maximum drawdown encountered during this simulation represented as currency.
Max Drawdown (%)	The maximum drawdown encountered during this simulation represented as a percentage.
Max Drawdown Date	The date when the maximum currency drawdown occurred.
Max Drawdown (%) Date	The date when the maximum percentage drawdown occurred.

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Winning Totals

Winning Trades	The number of trades where the profit is greater than 0. Trades that break even are considered losing trades.
Winning %	The percentage of trades where the profit is greater than 0.
Gross Profit	The total amount of profit represented as currency.
Average Profit ($)	The average amount of profit represented as currency.
Average Profit (%)	The average amount of profit represented as a percentage.
Average Bars Held	The average number of periods each winning position was open.
Consecutive Winners	The number of winning trades in a row.

Losing Totals

Losing Trades	The number of trades where the profit was less than or equal to 0. Trades that break even are considered losing trades.
Losing %	The percentage of trades where the profit is than or equal to 0.
Gross Loss	The total value lost represented as currency.
Average Loss ($)	The average amount lost represented as currency.
Average Loss (%)	The average amount lost represented as a percentage.
Average Bars Held	The average number of periods each losing position was open.
Consecutive Losers	The number of losing trades in a row.

System Parameters

This tab contains information about this particular system run.

Run Date	The date and time the system was run.
Run Length	The amount of time taken to complete the system execution.
System Parameters	This contains a list of all optimization parameters contained within the system and the value of those parameters for this run.

Position List

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The position list contains each trade aggregated into its respective position. Positions are nothing more than a grouping of trades. This screen shows the trades grouped by position.

This position list is split into two pieces. The top portion of the screen contains the list of positions established throughout the system. When a position is clicked or selected, the trades that are associated with this position are shown in the trade list below.

Position List Columns

Symbol	The tradable symbol name.
Type	The position type taken, long or short.
Shares	The maximum number of shares or contracts held throughout the lifetime of this position.
Open Date	The date the first trade was made for this position.
Close Date	The date the position was completely liquidated.
Avg Entry	The weighted average of opening trades in this position
Avg Exit	The weighted average price that the shares or contracts were closed/covered at.
Bars Held	The number of periods the position was open.
P/L Bar	The average amount gained or lost on a per bar basis.
P/L	The total amount gained or lost throughout the life of the position.
Description	The user assigned name of this position.

Trade List

The trade list contains the complete list of every trade generated by the simulation.

Trade List Columns

Symbol	The tradable symbol name.
Type	The type of transaction, either buy, short, sell or cover.
Transaction Date	The date the trade was placed.
Shares	Number of shares or contracts that were filled in this transaction.
Price	The fill price of the trade.
Commission	The cost of commissions for this trade.
Amount	The amount of capital added or deducted

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	from the account for this trade.
Description	The user assigned name given to this trade.
Cash	The amount of cash available in the account after this transaction was completed.

Symbol Results

The symbol results tab contains an aggregated list of the trades. The trades are aggregated by symbol. This provides a way to quickly determine which symbols are performing and which are not.

Symbol Results Columns

Symbol	The tradable symbol name.
Profit	The amount gained or lost for this symbol.
Profit per Bar	The amount gained or lost averaged over the number of bars held.
Trades	Total number of trades entered with this symbol.
Winners	The number of trades with a profit greater than 0.
Losers	The number of trades with a profit less than or equal to 0.
Winning %	The number of winning trades divided by the number of losing trades.
Avg Bars Held	The average number of periods each position was open.

Scan

The scan tab is useful for determining the next action that the simulation would take. For example, if the system trades daily bars, the scan would show the next day's actions to be taken such as opening a new position or closing an existing position. Theoretically, a daily, weekly or monthly time frame trader can use the results from the scan and generate orders manually.

Scan Columns

Date	The date that the action should occur.
Order Type	The type of order to be submitted to the broker. This could be any number of the order types supported by RightEdge.
Symbol	The tradable symbol name.

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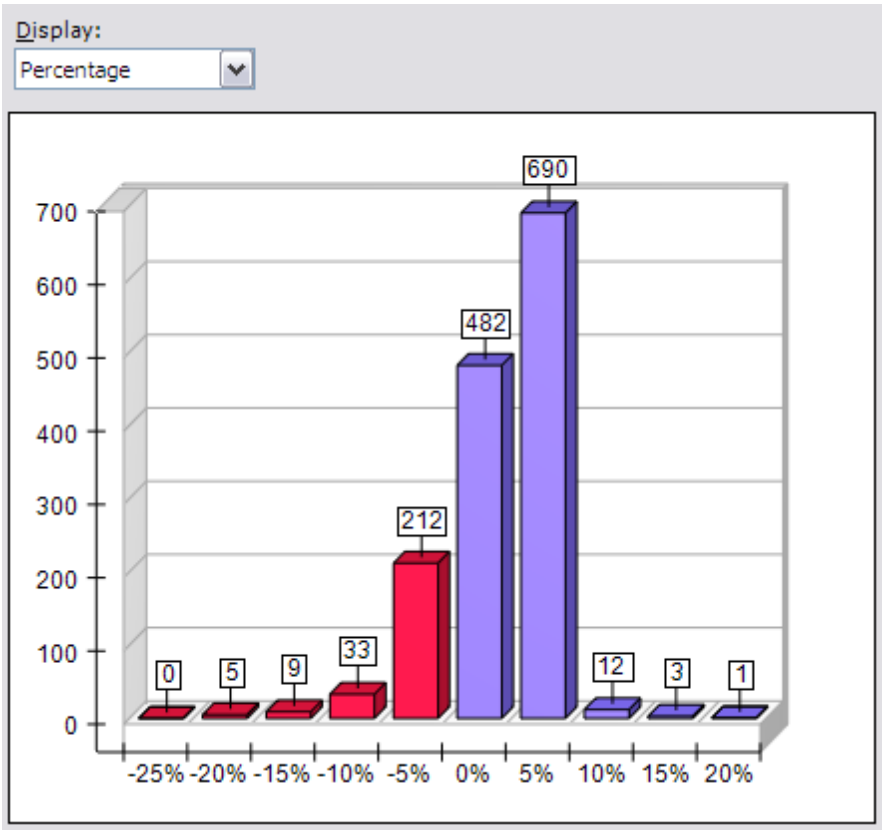
Order Price	If this is a limit order, the price of the limit order will be specified here.
Winners	The number of trades with a profit greater than 0.
Losers	The number of trades with a profit less than or equal to 0.
Winning %	The number of winning trades divided by the number of losing trades.

Charts

While the grid based system results are opened after every simulation, the chart tabs can have any number of charts pull up. There are a number of potential chart tabs and the default chart tabs are configurable under the Options dialog.

RightEdge ships with five charts.

- **Profit Distribution**
  The Profit Distribution chart breaks down the profit and loss values into scaled values. A sample profit distribution chart is shown below.



Use the ***Display*** dropdown to toggle between representing the chart in profit and loss

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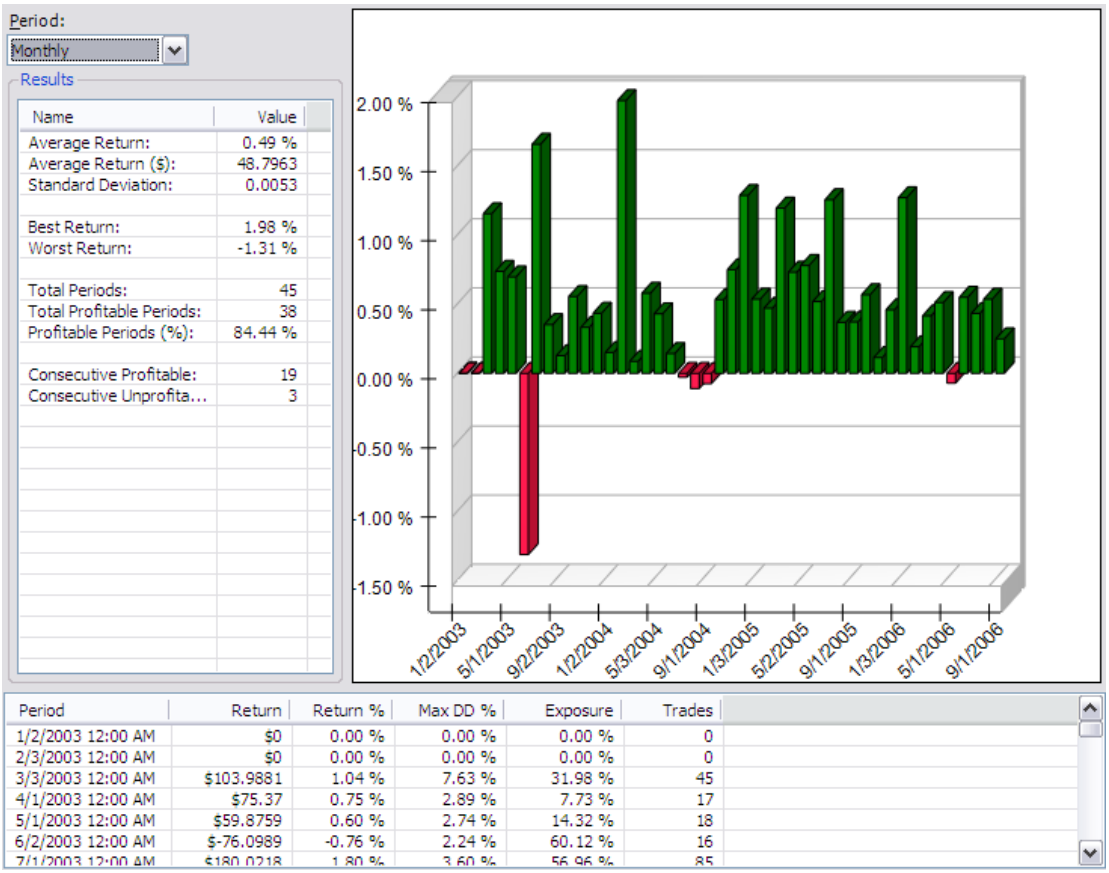
percentages and currency.

- **System Breakdown**
  The system breakdown chart is a bit unique in that it is a hybrid of text and graphics. It also has some interactivity features where you can select the aggregation level of weekly, monthly or yearly. The results are calculated in real time and the chart and results areas are updated. An example of the system breakdown chart is below.



- **Equity Curve**
  The equity curve chart represents the cash and asset value at each point during simulation. This is a visual way of assessing drawdown and exposure. The Buy and Hold account value is represent as a line displayed over the cash and asset value stacked series.

- **MAE / MFE**
  This chart is similar in look and feel to the profit distribution chart, however, this chart breaks out the MAE and MFE calculations on a percentage or currency basis. The chart is broken into two pieces. The MAE is displayed on the top half of the chart and the MFE is displayed on the bottom half.

- **Symbol Breakdown**
  The symbol breakdown chart is a simple pie chart that displays all symbols that took trades during the simulation period. This is chart allows a quick and easy way to visualize which symbols are taking trades and which symbols are not. This

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can help identify and prune "dead" symbols.

See Also

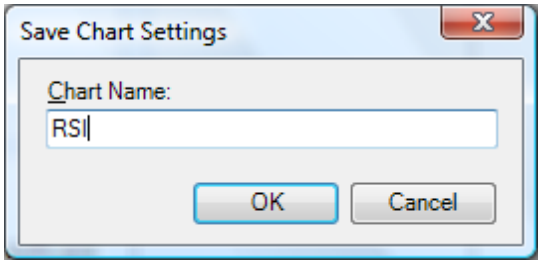
General Options

10.13 Save Chart Settings

RightEdge has the ability to save charts for later application. More specifically, it saves the chart's indicators and the associated indicator values so that they can be applied to another chart.

Creating Saved Charts

To save a chart in RightEdge, begin by opening a chart from Watchlist pane. Drag and drop the desired indicators onto the chart and set the desired parameters. Once the chart is set up, right click on the chart itself and select the ***Save Chart Settings...*** menu item. The ***Save Chart Settings*** will dialog will prompt for a name for this saved chart. This name is defined by the end user, but must be unique.



This saved chart has now been saved. To recall a saved chart, right click on any symbol in the Watchlist pane as shown below.

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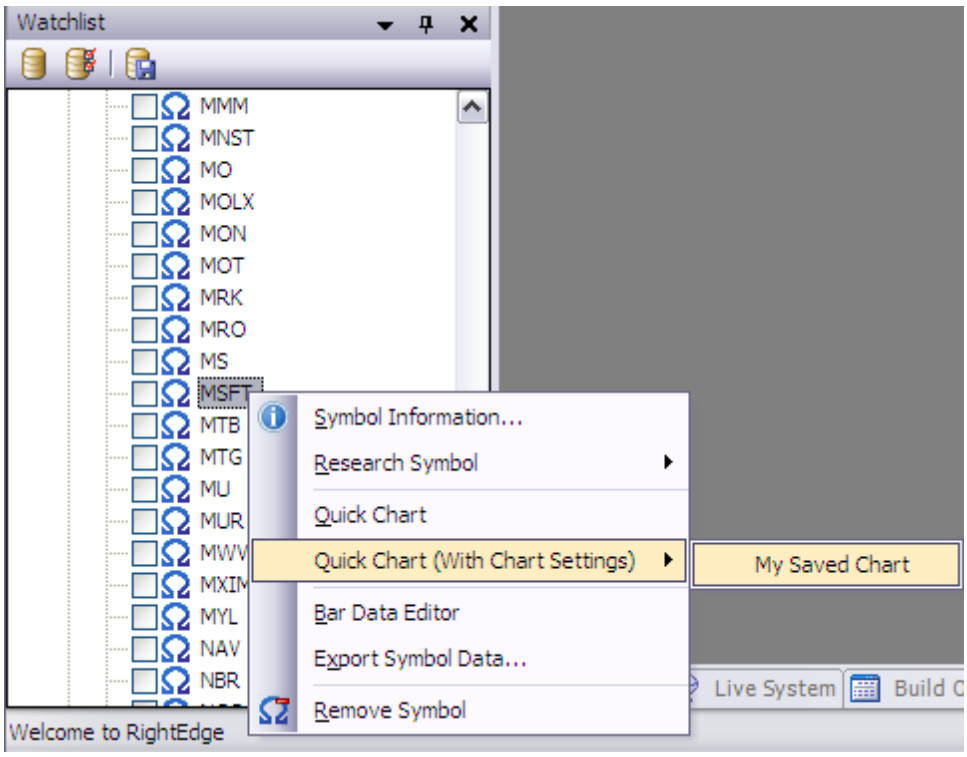

Select ***Quick Chart (With Chart Settings)*** and notice that the chart settings that were just saved appear in this list. The number of chart settings that can be saved is unlimited.

If a chart is already opened in the document area, saved chart settings can be applied to that chart by right clicking on the chart and selecting the desired saved chart name from the ***Apply Chart Settings*** menu item.

Managing Saved Charts

Right click on an open chart and if there are any saved charts, the ***Manage Chart Settings...*** menu item is available. Click this menu item to display the ***Chart Settings*** dialog.

For detailed information about the ***Chart Settings*** dialog see the Chart Settings section.

See Also

Indicator Pane
Watchlist Pane

10.14 Start Live Data

This help topic provides a very high level overview of back testing within RightEdge. It is assumed that you have already configured a live data service and a Watchlist. If not, please follow the links below.

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Configuring Services
Setup a WatchList

Select the symbols on the Watchlist pane to begin collecting data for. If you have not configured a watchlist, see the Setup a Watchlist section before continuing.

Now that the symbols are selected, select ***Start Data Feed*** button from ***Live Options*** toolbar. If there are no errors starting the collection, live data will be shown in the Live Data pane.

Once live data is started it can be stopped by the stop button on the live options toolbar or by stopping a currently running system.

Note: Open a live chart based on the collected data by double clicking any symbol in the live data list.

If you encounter any errors starting live data collection, refer to the Configuring Services section of the help to ensure that a live data provider is properly configured.

See Also

Using the RightEdge Environment
Setup a Watchlist
Start Live System
Charting Overview

10.15 See a Chart Now!

This topic serves as a quick guide to viewing a historical chart in RightEdge in less than a minute. RightEdge ships with data services and a Watchlist preconfigured. Locate the "Dow 30" folder within the Watchlist. Place a check next to the Dow 30 folder. This will select all of the symbols beneath this folder.

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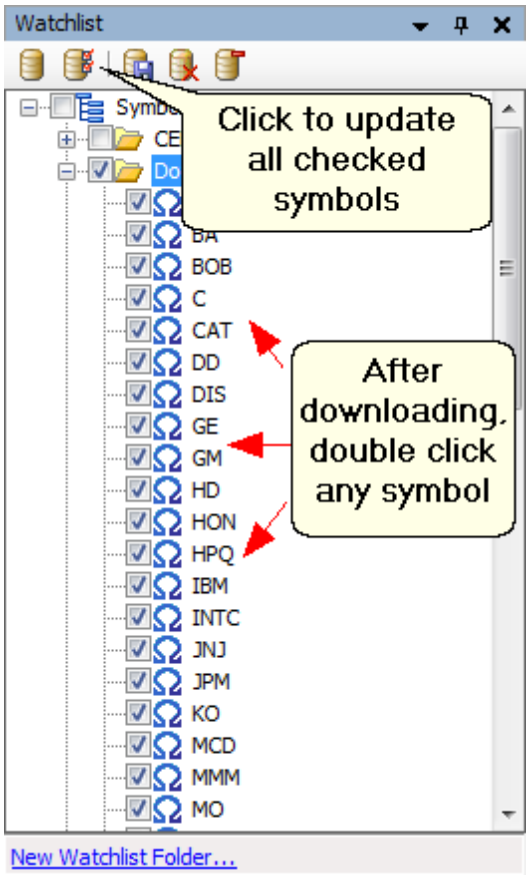

Click the update checked symbols button as shown above. **Note: You must be connected to the internet**. Data will be retrieved for all 30 symbols. When the download completes, double click any symbol in the list and a chart will be show in the document area.

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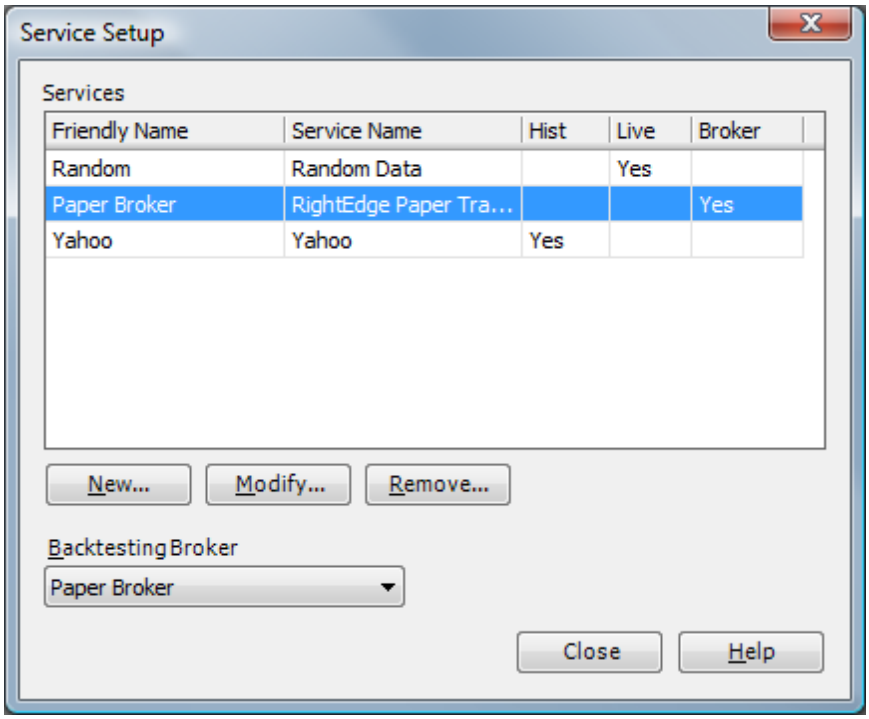
10.16 Setting a Simulated Broker

The Service Setup dialog contains information about the currently configured services.



Another item of interest on this dialog is the Backtesting Broker list. This option allows for a separate broker plugin to be run during a backtest. Since RightEdge runs backtesting and live code in the exact same way, it is generally not acceptable to have a live broker receiving orders in a simulated environment.

For this reason, the ***Backtesting Broker*** assignment is necessary. The default is the Paper Broker that ships with RightEdge. However, this can be any broker that works in a simulated environment and acknowledges simulated orders. The simulated broker must also handle available cash, open positions, buying power, etc.

See Also

Run Backtest/Simulation
Paper Broker Settings
Configuring Services
Modifying Services
Removing Services

10.17 Setting a Timeout

Timeouts can be set one of two ways in RightEdge. The first method involves setting the value at the system level within the trading system project settings. Once a trading system is open, click on the top most tree item in the Trading System pane. This will display the global properties for this trading system. If the Properties pane does not

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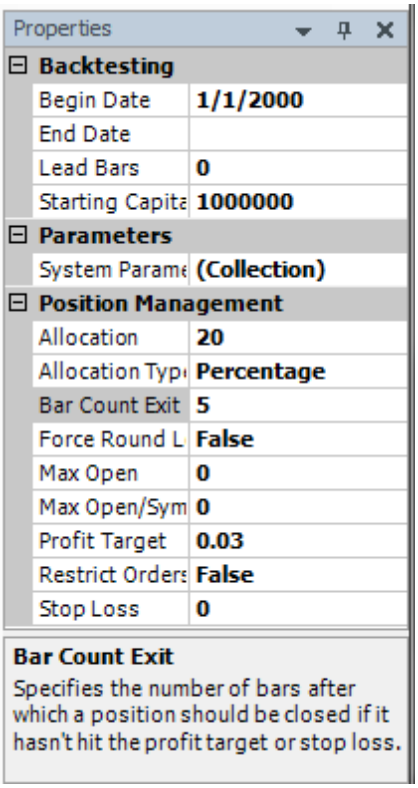
appear, force it to the visible state by selecting ***Properties Window*** from the ***View*** menu.



The *Bar Count Exit* field is highlighted above. Note that this is represented as a whole number and not a decimal. So in the case demonstrated above, a 10 bar timeout has been set. Set the timeout field to 0 if no timeout order is desired.

Timeout orders can also be set in code where they can be controlled more dynamically.

C#

```
public class SystemMain : SystemBase
{
    public override void Startup()
    {
        // Setting a global timeout for 10 bars
        PositionManager.BarCountExit = 10;
    }
}
```

Visual Basic

```
Public Class SystemMain
Inherits SystemBase
    Public Overloads Overrides Sub Startup()
        ' Set a global timeout for 10 bars
        PositionManager.BarCountExit = 10
    End Sub
End Class
```

The samples above show the timeout being set in the startup function. This is identical to

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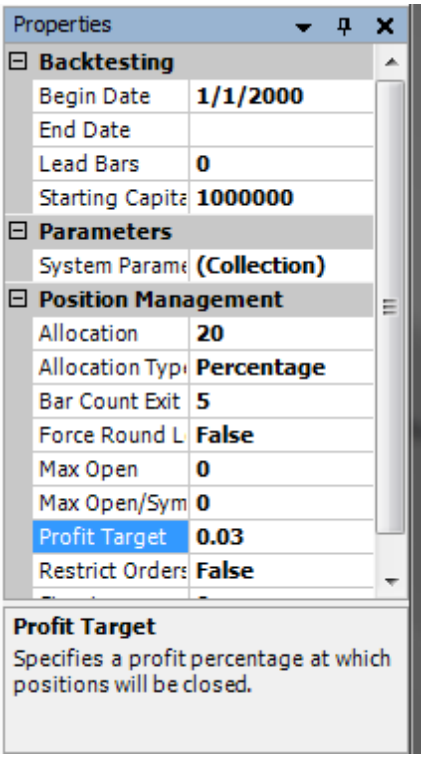
setting the timeout in the system properties. However, the BarCountExit variable can be set in any function and it is honored whenever a new position is opened (not necessarily when it is submitted).

See Also

Timeout
New Trading System
Trading System Pane

10.18 Setting a Profit Target

Profit targets can be set one of two ways in RightEdge. The first method involves setting the value at the system level within the trading system project settings. Once a trading system is open, click on the top most tree item in the Trading System pane. This will display the global properties for this trading system. If the Properties pane does not appear, force it to the visible state by selecting ***Properties Window*** from the ***View*** menu.



The profit target field is indicated in red. Note that this is represented as a decimal. So in the case demonstrated above, a 3% profit target has been set. Set the profit target field to 0 if no profit target order is desired.

Profit targets can also be set in code where they can be controlled more dynamically.

C#

```
public class SystemMain : SystemBase
```

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```
{
    public override void Startup()
    {
        // Setting a global profit target
        PositionManager.ProfitTarget = 0.03;
    }
}
```

Visual Basic

```
Public Class SystemMain
Inherits SystemBase
    Public Overloads Overrides Sub Startup()
        PositionManager.ProfitTarget = 0.03
    End Sub
End Class
```

The samples above show the profit target being set in the startup function. This is identical to setting the profit target in the system properties. However, the ProfitTarget variable can be set in any function and it is honored whenever a new position is opened (not necessarily when it is submitted).

See Also

Profit Target
New Trading System
Trading System Pane

10.19 Setting a Stop Loss

Stop losses can be set one of two ways in RightEdge. The first method involves setting the value at the system level within the trading system project settings. Once a trading system is open, click on the top most tree item in the Trading System pane. This will display the global properties for this trading system. If the Properties pane does not appear, force it to the visible state by selecting ***Properties Window*** from the ***View*** menu.

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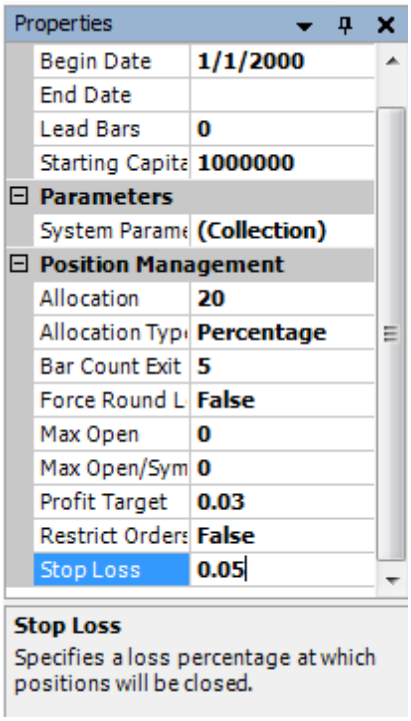

The Stop Loss field is indicated in red. Note that this is represented as a decimal. So in the case demonstrated above, a 5% stop loss has been set. Set the stop loss field to 0 if no stop loss order is desired.

Stop Losses can also be set in code where they can be controlled more dynamically.

C#

```
public class SystemMain : SystemBase
{
    public override void Startup()
    {
        // Setting a global stop loss
        PositionManager.StopLoss = 0.05;
    }
}
```

Visual Basic

```
Public Class SystemMain
Inherits SystemBase
    Public Overloads Overrides Sub Startup()
        PositionManager.StopLoss = 0.05
    End Sub
End Class
```

The samples above show the stop loss being set in the startup function. This is identical to setting the stop loss in the system properties. However, the StopLoss variable can be set in any function and it is honored whenever a new position is opened (not necessarily when it is submitted).

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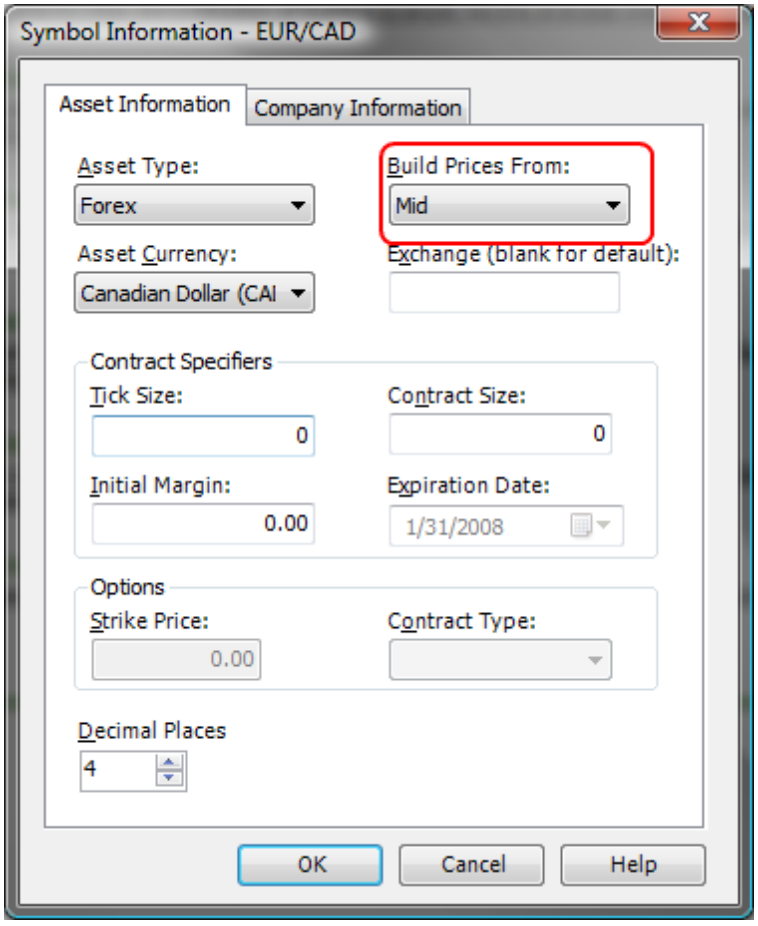
See Also

Profit Target
New Trading System
Trading System Pane

10.20 Collecting Forex Data

If you are receiving ticks, but not bars while collecting forex data, it is likely that your forex provider is not sending a *last trade* tick. This is uncommon in everything else but spot forex. Typically in this case, the forex dealer or data provider sends only bid and ask data. If this is the case, a small change to your symbol configuration will allow RightEdge to generate bar data from either the bid, the ask or the mean between the bid and ask.



Right click on any symbol and select Symbol Information. Be sure the Asset Type is "Forex" and most importantly that the *Build Prices From* selection is either bid, ask or Mid.

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11 Data Sources

11.1 Configuring Data Sources

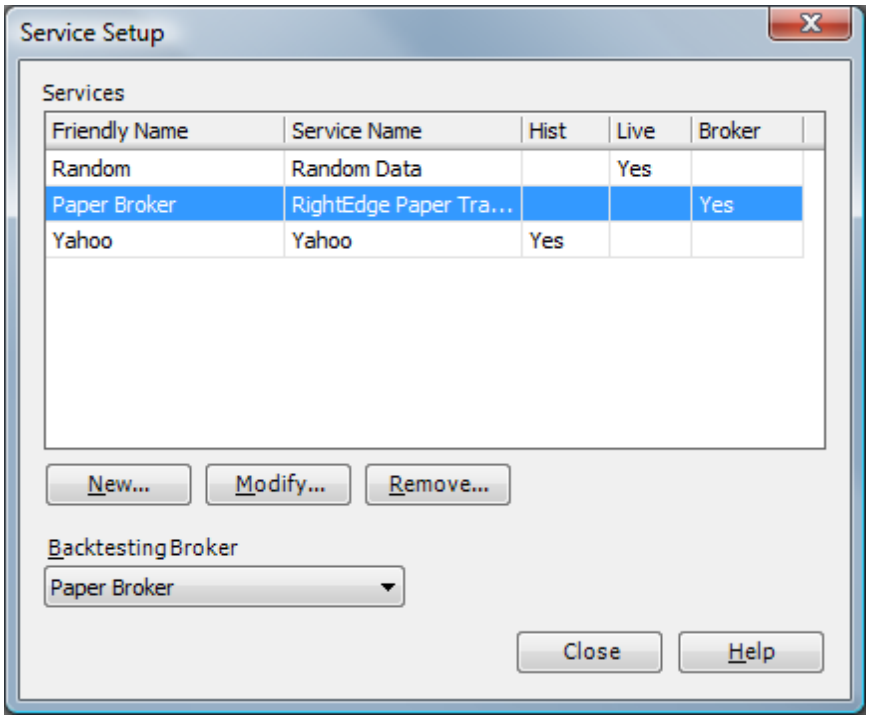
A ***service*** is a type of plugin that may supporting retrieving realtime data, retrieving historical data, or connecting to a broker. Services are associated with symbols in the Watchlist pane. You can set up a hierarchical folder structure and have child folders inherit settings from their parents (or override those settings).

Simply put, this is how to retrieve and act on data.

RightEdge provides a simple, yet robust means of organizing not only data, but the means in which data is acted upon. Services are configured at a global level, yet they are assigned at a group level and can be optionally inherited down the tree.

First, the services must be configured.

Select the ***Configure Services...*** menu item from ***Tools*** menu.



RightEdge comes default with a predefined service for Yahoo and it is named "Historical". The Service Setup list will show the capabilities of a configured server. Since some plugins support more than one piece of functionality, this is the place to determine the available functionality for each plugin and whether or not it is currently configured to use.

In this case, the Yahoo service has the ability to retrieve historical data. It does not have the ability to retrieve live data, nor does it provide broker services.

To add a new service, click the ***New...*** button. A wizard prompting for information that this service needs will follow. Upon the completion of the wizard steps, the service will appear in the list.

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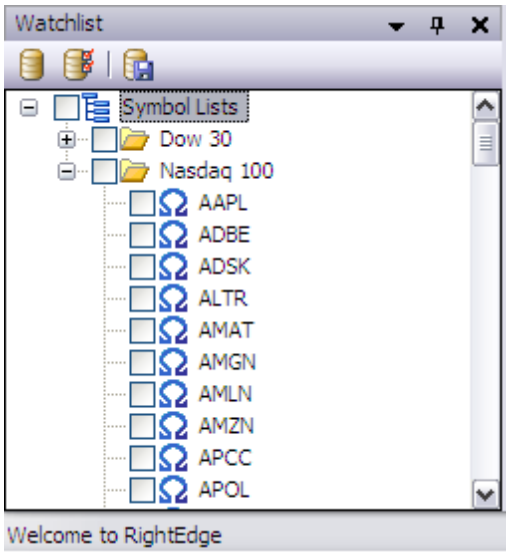
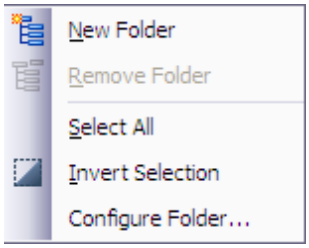
Assigning Services

Setting up a service is the first step in realizing the functionality of the service. The next step is to assign this service to a group of symbols.



RightEdge ships with a couple of default folders already configured. The two symbol folders are the Nasdaq 100 and Dow 30. Right click on the top level node or any folder underneath and select ***Configure Folder...***



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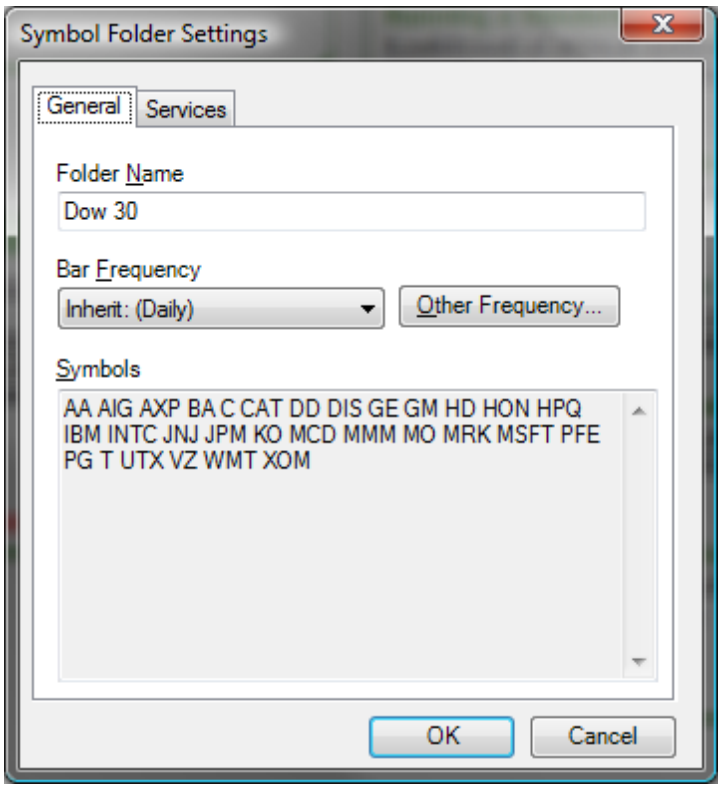

The Dow 30 folder contains the list of symbols that are contained within this folder. Folders can contain any number of symbols, the only requirement is that they're all the same frequency (i.e. daily, weekly, 5 minutes, 1 minute, etc). This is set (or inherited) in the ***General*** tab.

Items added or removed from ***Symbols*** field with be added or removed from the folder and subsequently the user interface.

Click the ***Services*** tab to assign a service to this folder.

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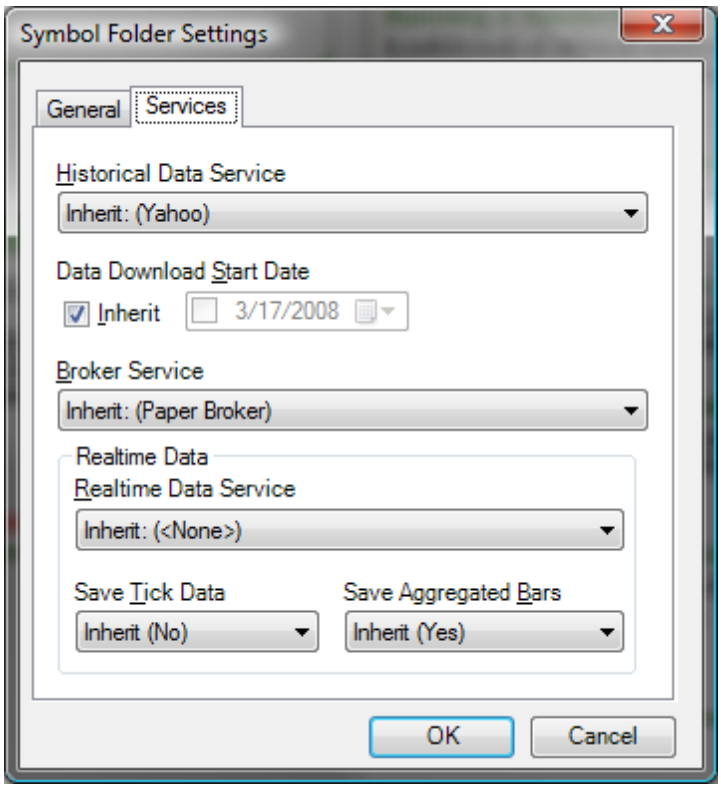

As previously mentioned, RightEdge ships with a predefined historical data plugin for Yahoo. This service is configured with the name "Historical". "Historical" shows up in the list and is currently assigned to the Dow 30 folder. For the case of historical data plugins, it is possible to set a start date at which historical data is retrieved. For example, GE contains nearly 50 years of historical data on Yahoo. It may not be necessary to retrieve this much data. Select the ***Data Download Start Date*** to limit this data collection.

Broker and real time data services will also be assigned here.

For software developers interested in developing service plugins, please visit the Service & Plugin Overview section.

See Also

Modifying Services

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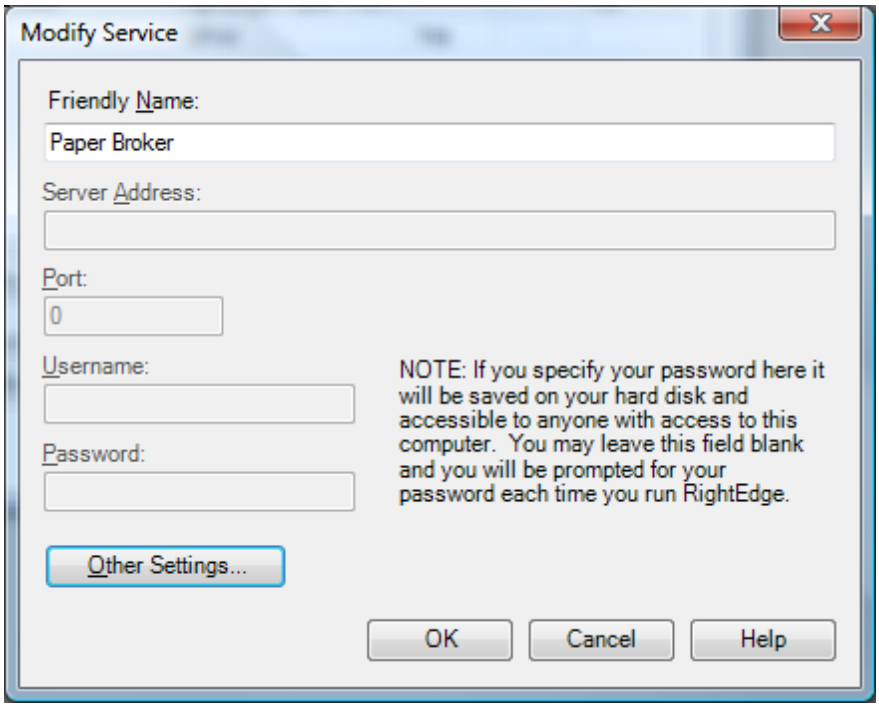
12 Services

12.1 Modify Service

Once a service is created, the parameters of the service may be changed. Select ***Configure Services...*** from the Tools menu. This dialog displays a list of currently configured services. Select the service to change and click the ***Modify*** button.


Modify Service
Friendly Name:
Paper Broker
Server Address:
Port:
0
Username:
Password:
NOTE: If you specify your password here it will be saved on your hard disk and accessible to anyone with access to this computer. You may leave this field blank and you will be prompted for your password each time you run RightEdge.
Other Settings...
OK
Cancel
Help

This dialog is similar to that displayed when the service is initially configured.

Friendly Name This is the text that will be displayed when referencing this service in the Watchlist folder setup. These names must be unique.

Server Address Some services may need to connect to a pre-defined IP address. This is usually provided by the service provider. If this is required, this field will be enabled. An example of a server address might be 206.152.8.1 or data.mydataprovider.com.

Port Some services may need to connect to a pre-defined port. This is usually provided by the service provider. If this is required, this field will be enabled. An example of a port might be 8000 or 7623. This is always a single number.

User Name Some services may need to authenticate the requestor. This field will hold the user name given to you by your service provider. If this is required, this field will be enabled.

Password Some services may need to authenticate the requestor and will require a password. This field will hold the password given to you by your service provider. If this is required, this field will be enabled.

Other Settings Some services may have service specific settings that apply to that particular service. If this is the case, the ***Other Settings*** button will be enabled. When

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this button is clicked, the service will display the user interface supplied by the service.

See Also

Configuring Services
Simulated Broker
Removing Services

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13 Charts

13.1 Using RightEdge Charts

Charts are one of the most important components of any trading system development package. After all, that's where all of the action is displayed in living color. We made it a point to create flexible chart settings and navigation with features that not only make it easier to get from point A to point B, but to do it in style.

A chart can be displayed in any number of ways in RightEdge, but the easiest way is to double click a symbol in the Watchlist pane. If the Watchlist pane is not visible, enable it by selecting ***Watchlist*** from the ***View*** menu.

First some points about data display control. RightEdge charts provide the standard way of zooming in and out using the toolbar buttons (and) to show more bars or less bars. However, in addition to this, RightEdge will also allow a finer control by dragging the mouse over bars to be displayed. This is done simply by starting at the left side of the chart, clicking the left mouse button and dragging to desired bar on the right. Once the mouse button is released, the new selection is zoomed in.

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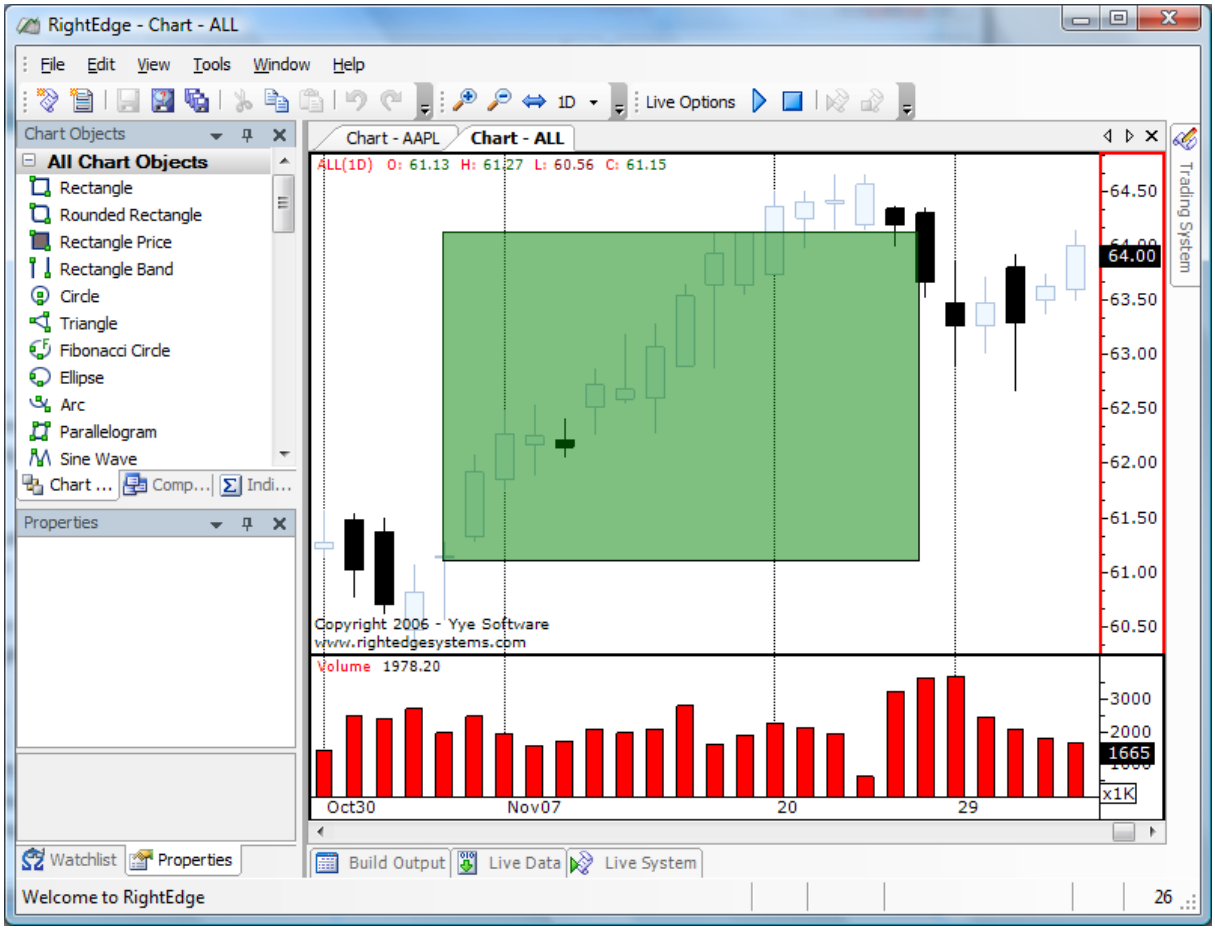

For navigation, RightEdge also provides the familiar controls, but in addition to using the scrollbar, RightEdge makes use of the mouse wheel. Move the mouse wheel down to go back in time and up to move forward in time.

Finally, the chart package in RightEdge provides a combination of scrolling and navigating within the X and Y axis. Both axes are broken up until thirds. If you place the mouse cursor on left third of the X axis (date/time axis), the cursor becomes a "sizing" cursor. Click and hold the left mouse button while moving the mouse left or right and more or less bars will become visible in the left side of the chart. Release the mouse button when the desired number of bars come into view. Now move the mouse cursor to the middle third of the X axis and the cursor becomes hand with an extended index finger. Click and hold the left mouse button and this will move the chart from left to right based on the mouse movement. Finally, move the mouse cursor to the right third of the X axis and click and hold the left mouse button. This will allow finer control of the bars displayed on the right hand side of the chart. This logic holds true for the Y axis as well.

Changing Frequencies

RightEdge supports a number of frequencies. The most common frequencies are shown on the chart toolbar alongside the zoom features discussed previously. The default is daily, abbreviated as "1D". Click the "1D" text to display the frequency drop down. Depending on the data that is currently loaded, the available frequencies are enabled. For example, if the lowest frequency of the data is daily bars, anything less than one day is unavailable. Select ***Weekly*** from the dropdown to automatically rebuild this chart with the same data

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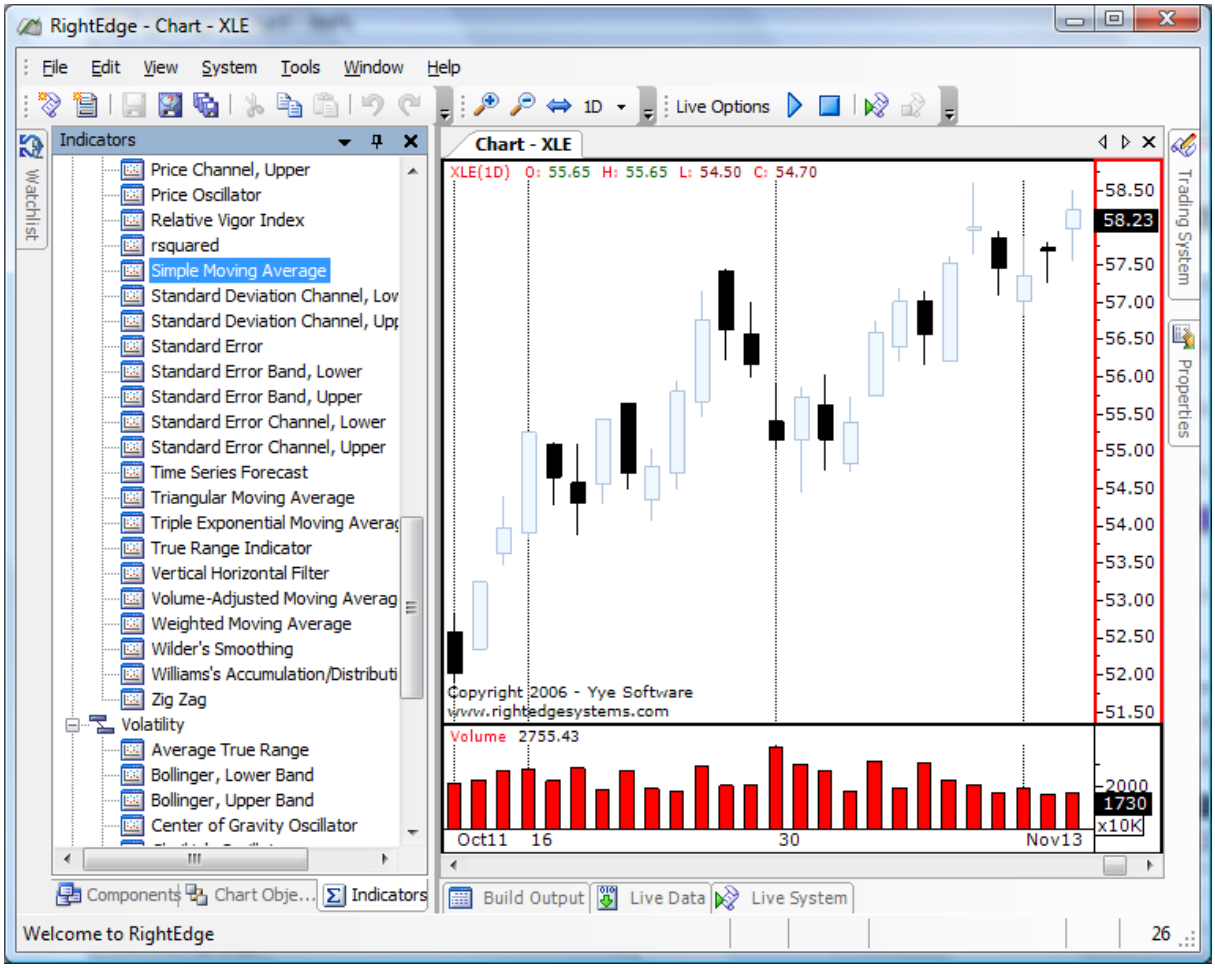
except for that bar data is aggregated to weekly.

Using Indicators

Of course, indicators are tightly coupled with charts. Putting indicators onto a chart is accomplished but a simple drag and drop operation. All of the indicators available for drag and drop and system developers are located in the ***Indicators*** panel. This panel is on by default, but if it cannot be located, select the ***Indicators*** menu option from ***View*** menu.



The indicators are grouped. Out of the box, RightEdge ships with over 80 indicators in five separate groups. For simplicity sake, let's plot a simple moving average (SMA) onto this chart. Click the Simple Moving Average once and hold the left mouse button down. Drop the indicator onto the chart frame and the following dialog is presented:

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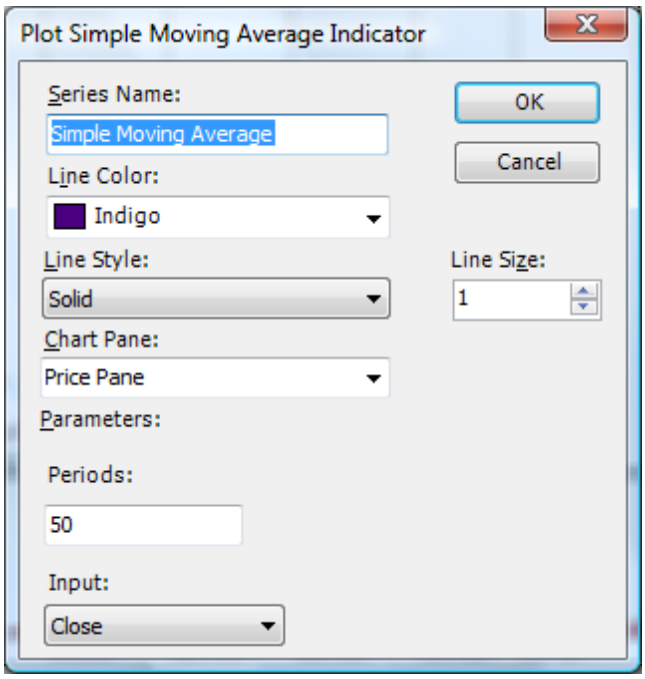

The defaults are presented and clicking OK will plot a 50 period simple moving average onto the chart. It's that simple.

The indicator can be removed from the chart by selecting the indicator with the left mouse button to "highlight" the indicator line and hitting the delete key. The plotted 50 day simple moving average selected is shown below.

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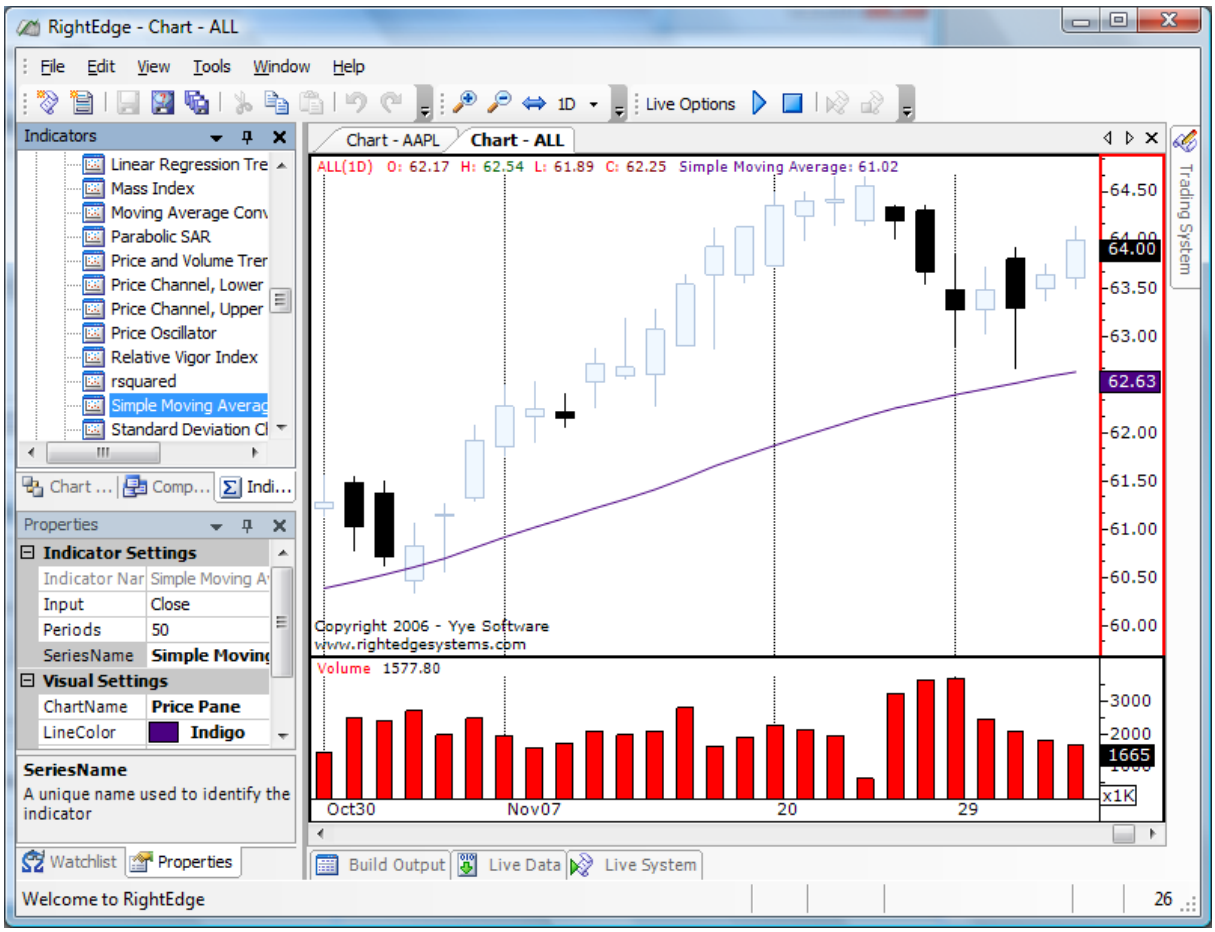

Not all indicators are useful on the price pane of course. When dragging an indicator onto a chart, a default pane is recommended. This pane can be named anything. If the pane name does not exist, a new pane is created. Dragging a Relative Strength indicator onto the chart demonstrates this.

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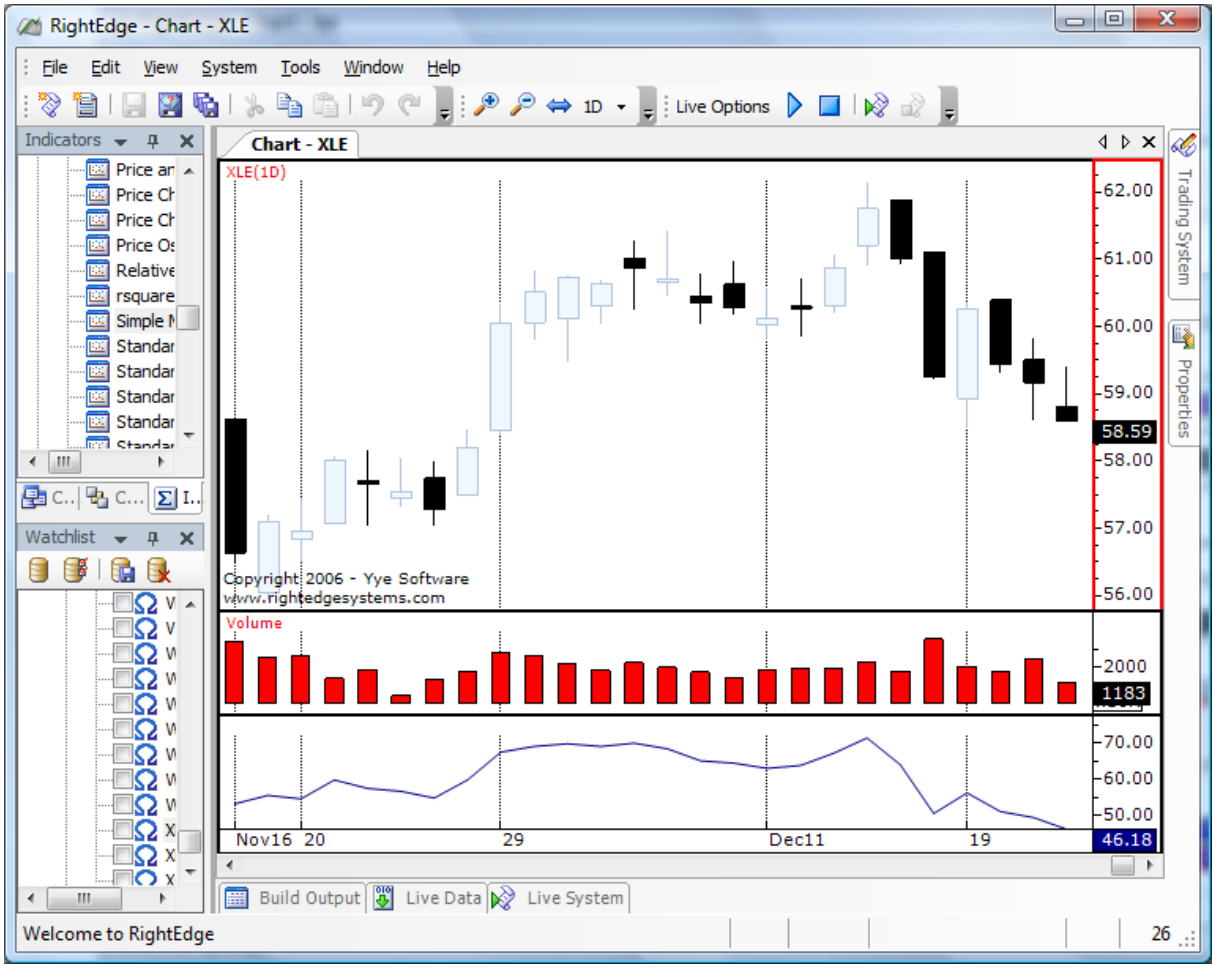

To remove user defined panes, right click in the pane and select ***Close Pane***.

Using Chart Objects

Chart objects encompass all items that are related to shapes and not necessarily price information. Chart objects are used to help identify or outline patterns such as support and resistance lines or channels. Chart objects are useful to both pure technical as well as discretionary traders. The Chart Objects pane is located in the upper left pane by default. If the Chart Objects pane is not visible, select ***Chart Objects*** from ***View*** menu.

The Chart Objects panel breaks the objects down into logical types. Simply click an object heading to expand the group and reveal the underlying available objects. To start, expand the ***Lines*** group. Click the Line object and drag it onto an open chart. Release the mouse button to establish the first point of the line. Move the mouse to change the length and direction of the line.

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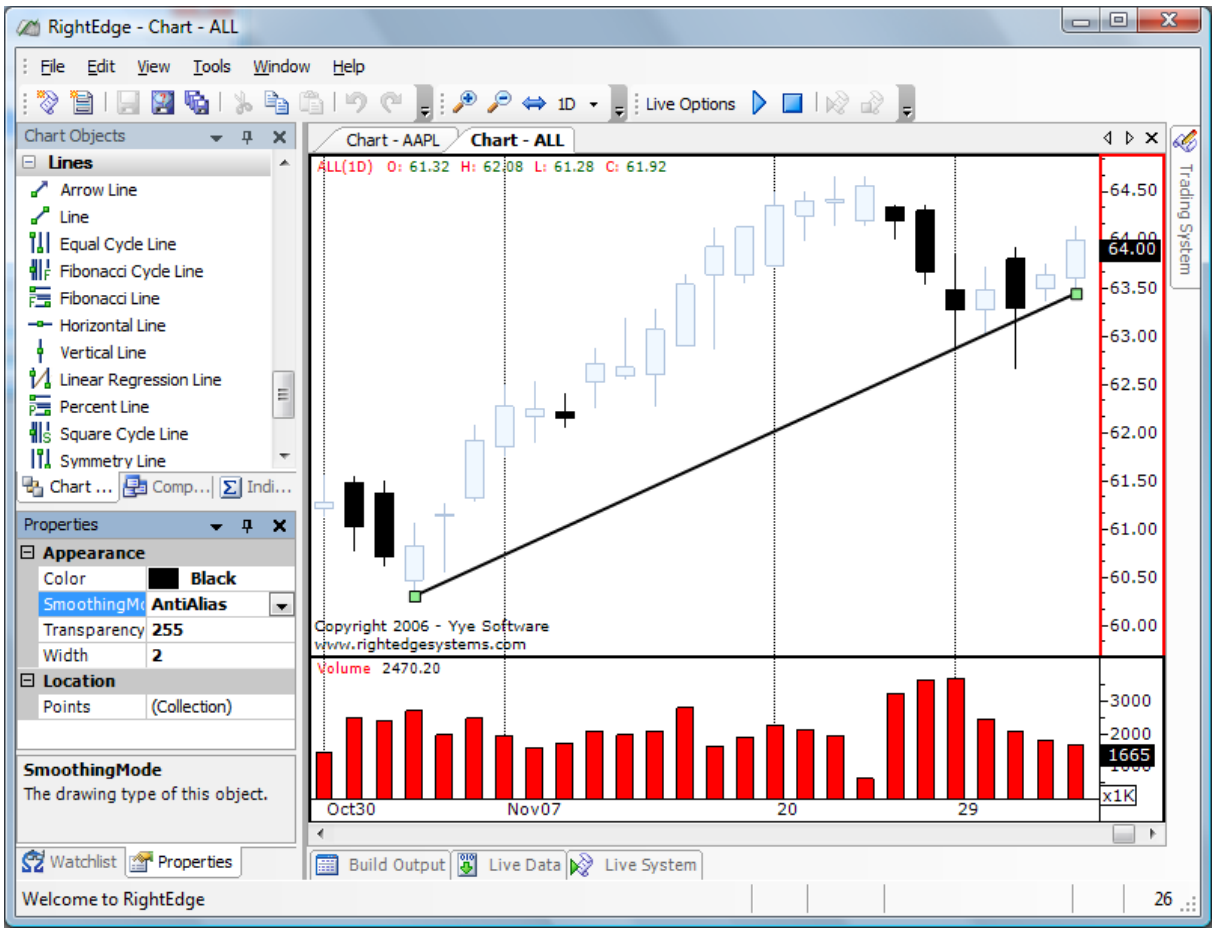

Once the line is in the desired position, click the left mouse button to finish the line creation. Once the line is created, items specific to this object will show in the properties window. Objects that are created using this method are changeable, movable, and can even be removed. To change the direction or size of this line object, click either end of the line on the end points and hold the left mouse button down while moving the mouse. When the mouse is released, the object will snap to its new position. Move towards the middle of the line and a "hand" mouse cursor will appear. Click the left mouse button drag the object to the desired location. Release the mouse button and it will be placed in this location. Hitting the delete key will remove the line object from the chart.

Notice that the chart objects maintain their location. Scrolling the chart will keep the line in its original position. The same holds true for various time frames. If the line was drawn on a chart showing daily bars, then the chart timeframe is switched to weekly, the line will update accordingly.

Object properties are updated in real time. Select the ***Color*** property in the property grid and select any color. The color of the line will change to the selected color. The width indicates how many pixels are used to draw the line. The larger the number, the wider the line. Transparency controls how much of the background is blended with the object. The range is 0 through 255. 0 indicates complete transparency, in other words, an invisible object. 255 indicates that the line will be solid and the background of the chart will not show through. To demonstrate how all of these settings effect this simple line, change the width to 3, the transparency value to 40 and the Smoothing Mode to Anti Alias. With these settings, it's quite obvious how a support or resistance line could be drawn without

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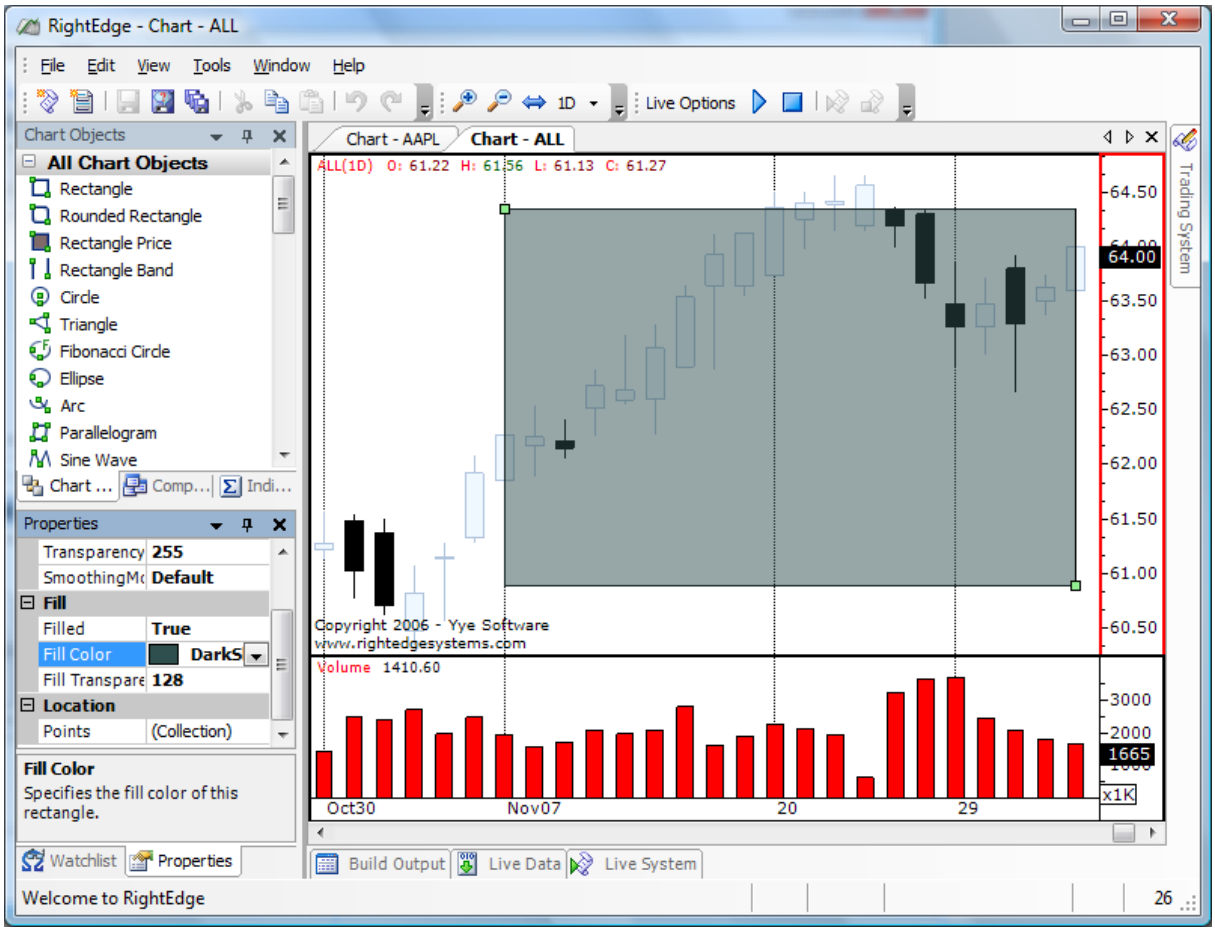
getting in the way of the price movement.

The chart objects also support basic shapes such as circles, rectangles, ellipses, and parallelograms. Expand the ***Basic Shapes*** chart object group and drag a Rounded Rectangle onto the chart. There are more properties for this object as shown below.



In this example, the line color was changed to dark gray. The ***Filled*** flag was set to true, the fill color to light green and fill transparency to 120.

To demonstrate a more complicated object and show how several objects might work together, go back to the ***Lines*** object group and drag a Fibonacci Line onto the chart. Set the properties for this object as shown below.

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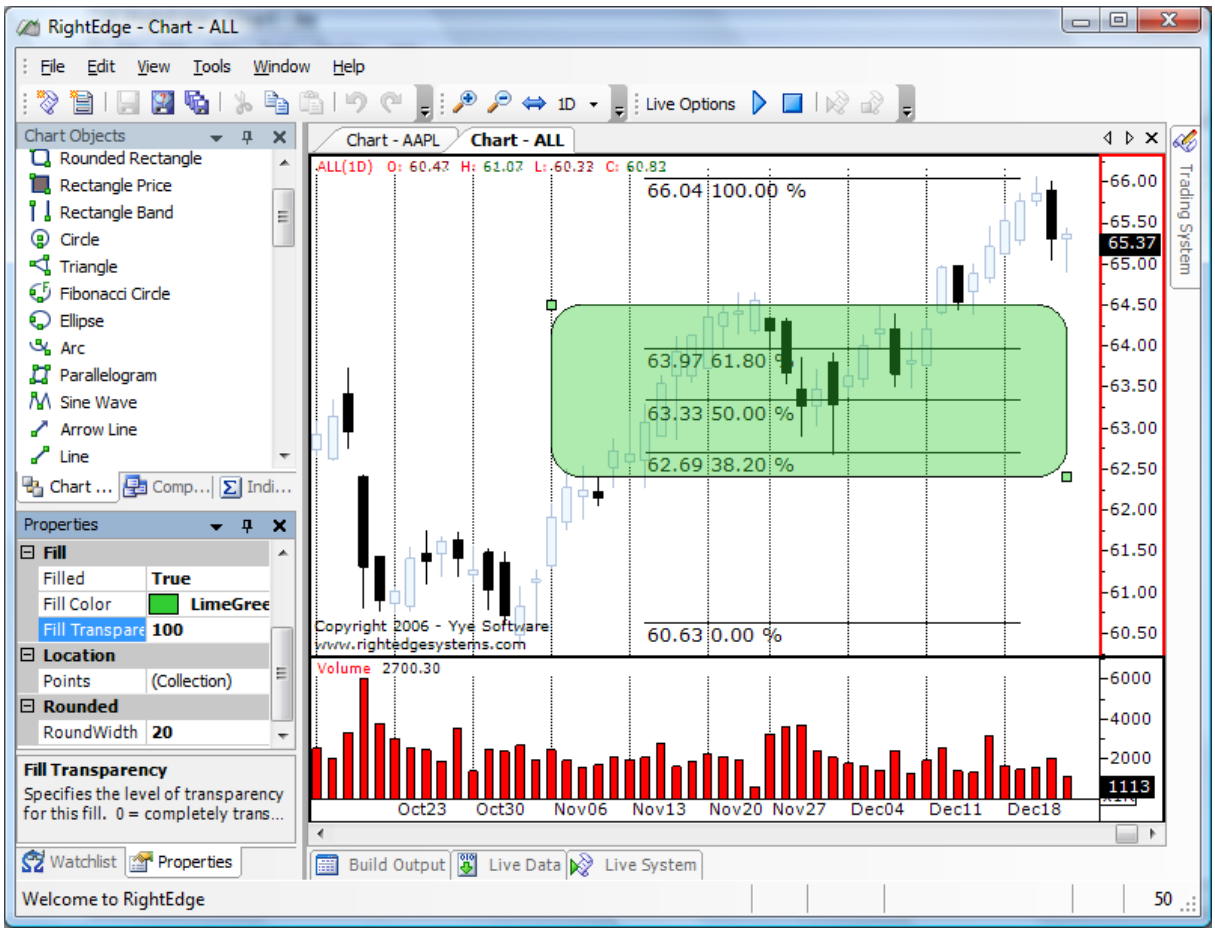

The Fibonacci line draws lines at the well known Fibonacci retracement values. Stretch the rounded rectangle to highlight these important retracements. It now becomes clear when the price penetrates that retracement area. All of these objects are still not in the way of the price bars.

13.2 Opening Live Charts

Live charts are available while live data is being collected. It is important to have a grasp on how to configure and collect live data in RightEdge first. See the Capturing Live Data topic for more information. While real time data is streaming, data is stored at the specified frequency so that charts can be created. To open a single chart, double click a symbol in the Live Data pane. To open one or more live charts, the Select Live Chart screen is an appropriate choice. When displayed, a list of current symbols that are streaming will display in the list as shown below.

Use the Ctrl key to select multiple symbols. When the desired symbols are selected, click the OK button. If the charts for these symbols are not already displayed in the main document area, they will be created.

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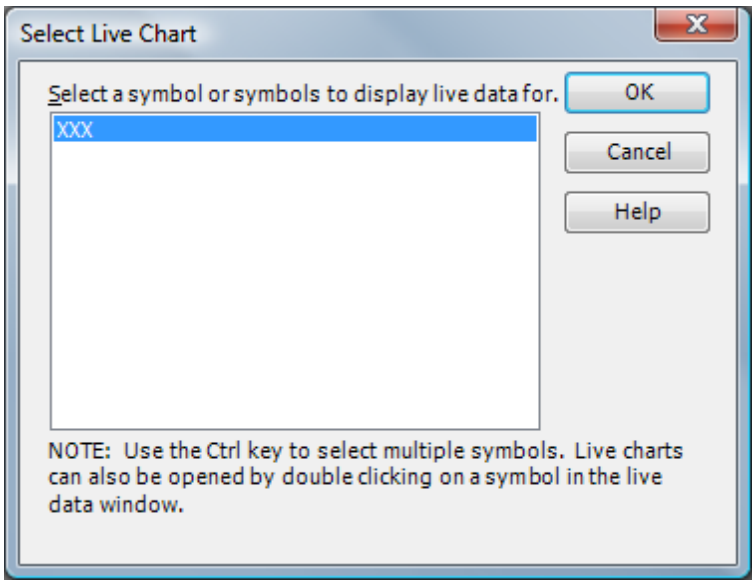
Select Live Chart
Select a symbol or symbols to display live data for.
XXX
OK
Cancel
Help
NOTE: Use the Ctrl key to select multiple symbols. Live charts can also be opened by double clicking on a symbol in the live data window.

See Also

Using the RightEdge Environment
Capturing Live Data
Floating Documents and Charts
Stacking Charts

13.3 Bar Chart

A bar chart displays series as sets of horizontal bars that are grouped by category. Values are represented by the length of the bars as measured by the x-axis. Category labels are displayed on the y-axis. Bar charts are typically used to compare values between categories.

Bar charts are typically used to represent volume on a stock chart as shown below.

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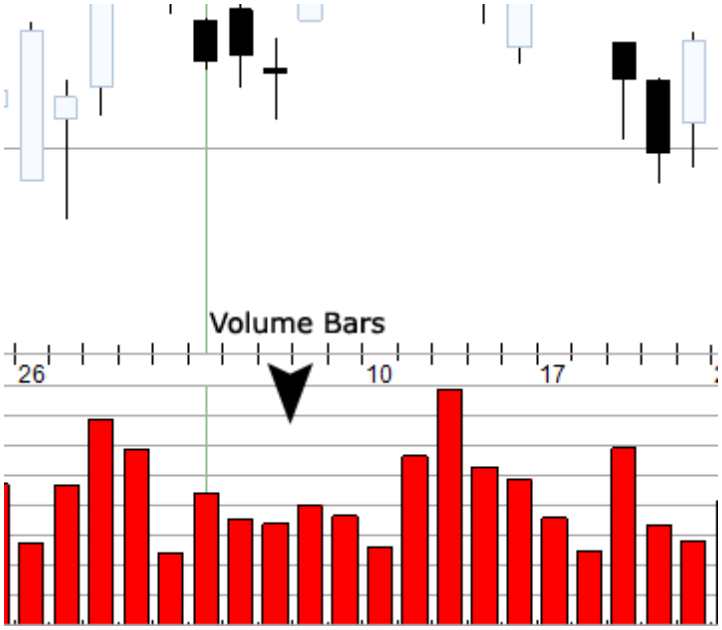

See Also

Candlestick Charts

13.4 Candlestick Chart

Candlestick charts are sometimes referred to as Japanese candlestick charts since 17th century Japanese traders were reported to use these types of charts to speculate on rice prices. Candlesticks contain the same data as a normal bar chart but highlight the relationship between opening and closing prices. The narrow stick represents the range of prices traded during the period (high to low) while the broad mid-section represents the opening and closing prices for the period.

If the close is higher than the open, the candlestick body is said to be "hollow" or "open". A higher price is typically represented with a light color.

If the open is higher than the close, the candlestick body is said to be "dark" or "closed". A lower price is typically represented with a dark color.

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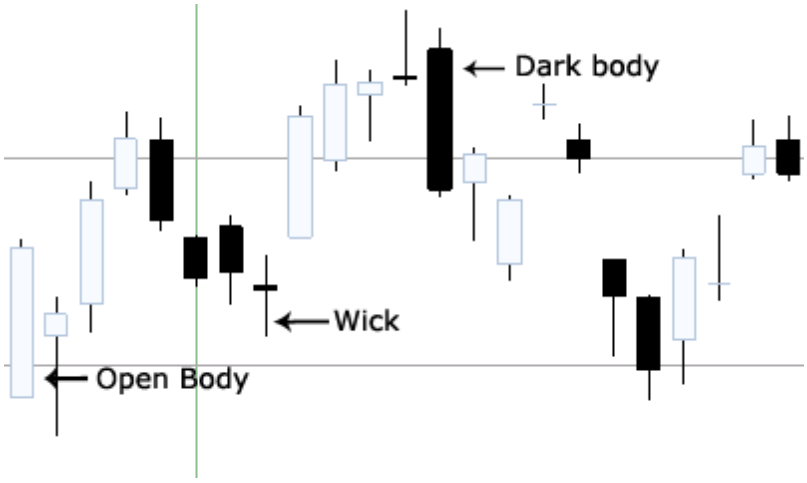

The chart above points out some of the basic features of the candlestick charts.

The "wick" portion of the chart is the high and low information. If there is a wick at the bottom, this would be the lowest price of the bar. On the contrary, a wick at the top most portion of the candlestick represents the high point of the day. If the candlestick is open and has no top wick, the bar ended on the highest price. If the candlestick is closed and has no bottom wick, the bar ended on the lowest price.

See Also

Candlestick Chart Patterns
Line Charts
Bar Charts

13.5 Line Chart

A line chart displays series as a set of points connected by a line. Values are represented by the height of the point as measured by the y-axis. Category labels are displayed on the x-axis. Line charts are typically used to compare values over time.

A line chart displays a series as individual straight lines, with a data point for each category. The height of each data point is determined by the value.

Line charts can be used to represent price or volume data, however, they are typically used to plot the values calculated from technical indicators, as shown below.

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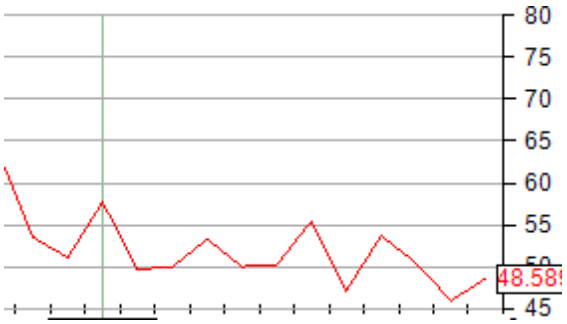

See Also

Bar Charts
Candlestick Charts
Technical Indicators

13.6 Stacking Charts

Often times it is desirable to see two or more charts in the document area. This can be accomplished by stacking charts or viewing them side by side. To begin a stack operation, click the tab area of the document with the left mouse button and begin to drag the tab. When the drag operation begins, docking arrows will be displayed as shown below:

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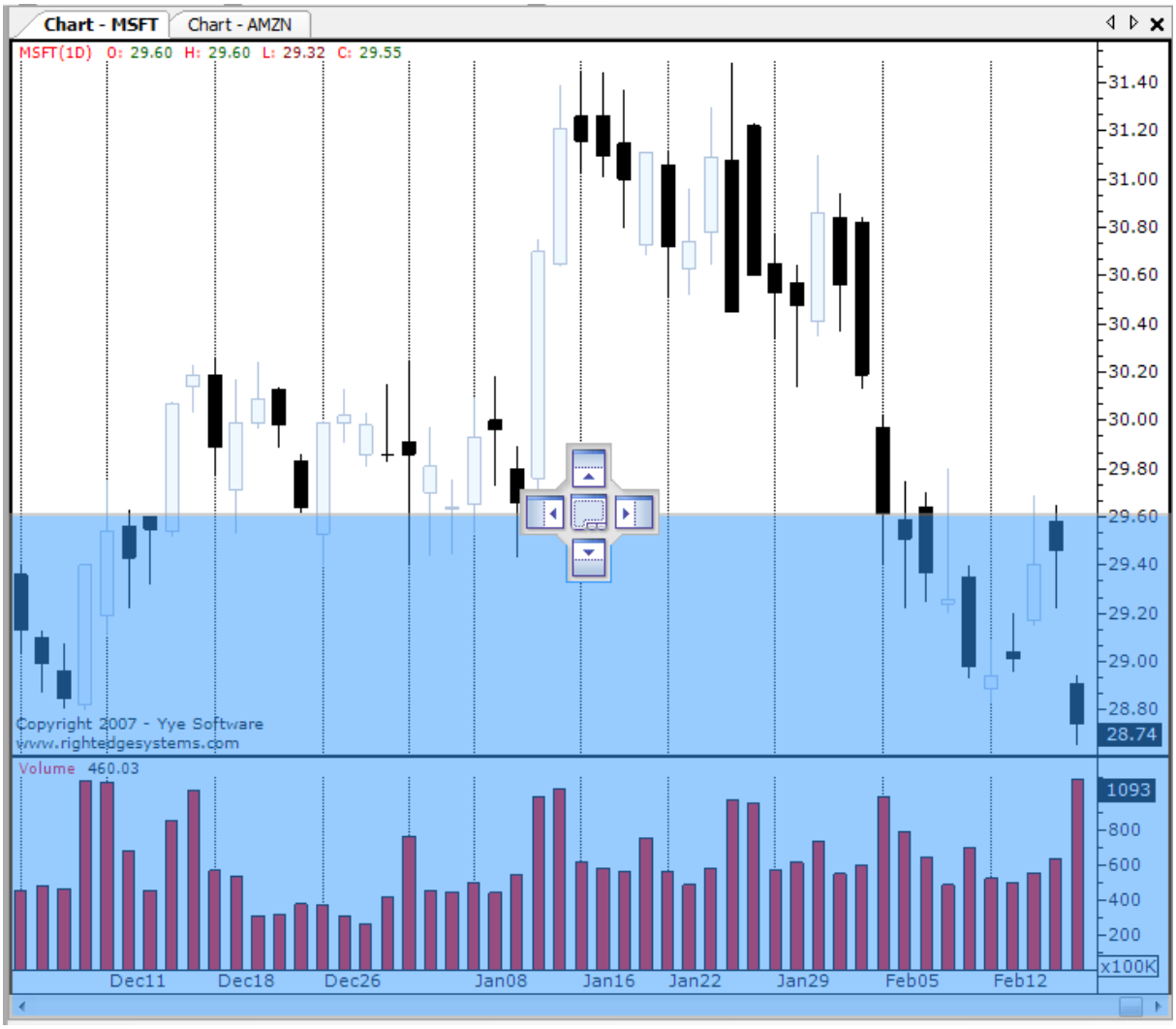

In this example, the MSFT tab was dragged and the mouse cursor was brought to the bottom dock arrow. Release the mouse the button on this dock arrow to dock MSFT below AMZN as shown below.

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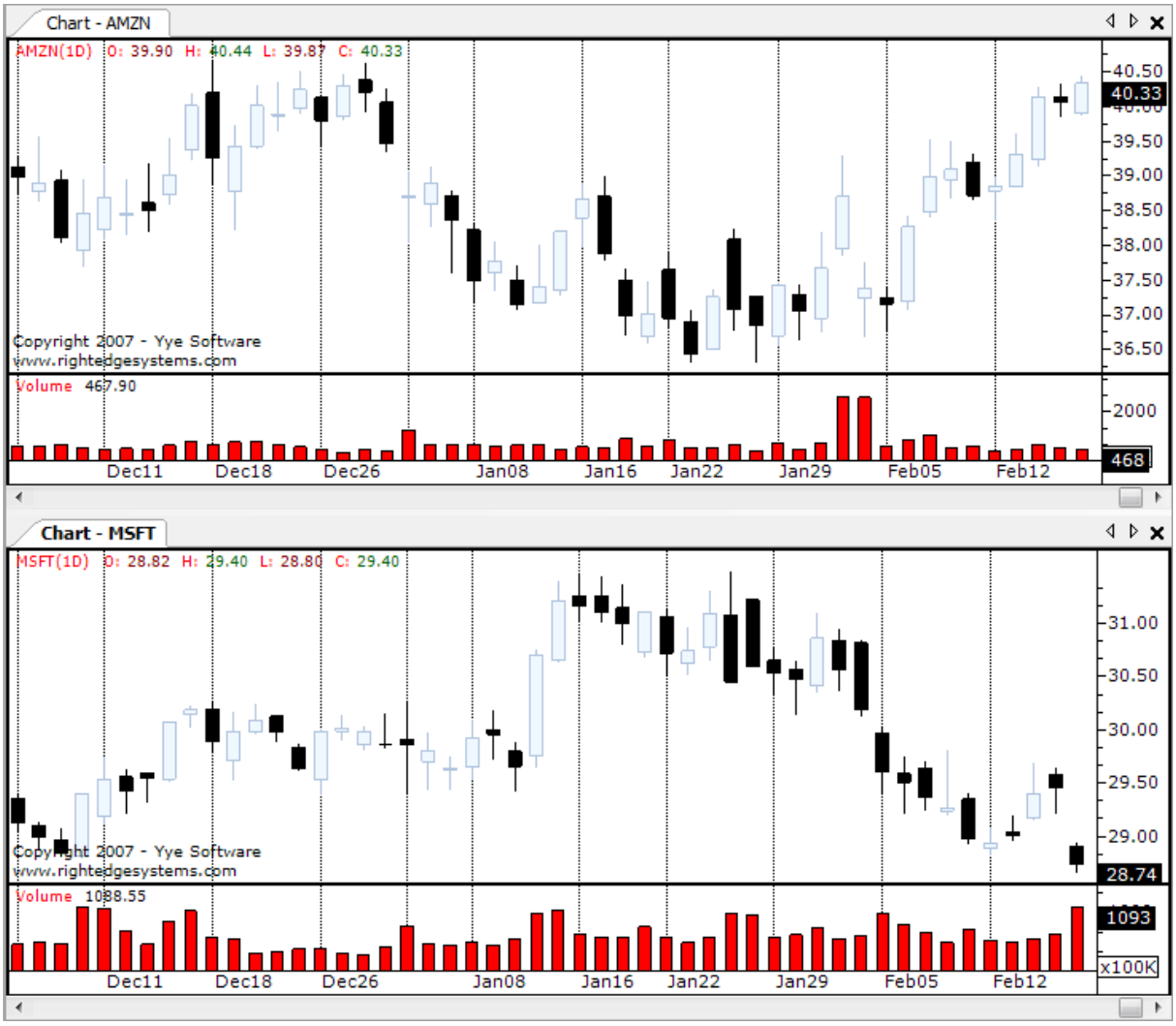
Chart - AMZN
AMZN(1D) O: 39.90 H: 40.44 L: 39.87 C: 40.33
Copyright 2007 - Yye Software
www.rightedgesystems.com
Volume 467.90
Dec11 Dec18 Dec26 Jan08 Jan16 Jan22 Jan29 Feb05 Feb12
Chart - MSFT
MSFT(1D) O: 28.82 H: 29.40 L: 28.80 C: 29.40
Copyright 2007 - Yye Software
www.rightedgesystems.com
Volume 1088.55
x100K

To snap the chart or document back to the document area, simply grab the title bar portion of the floating window and drag it back to the document area.

Each chart scrolls independently.

See Also

Using the RightEdge Environment
Floating Documents and Charts

13.7 Using Chart Objects

Chart objects are the groups of shapes, text and images that can be placed on a chart both manually and programmatically. Each available chart object is displayed in the chart object pane (shown below).

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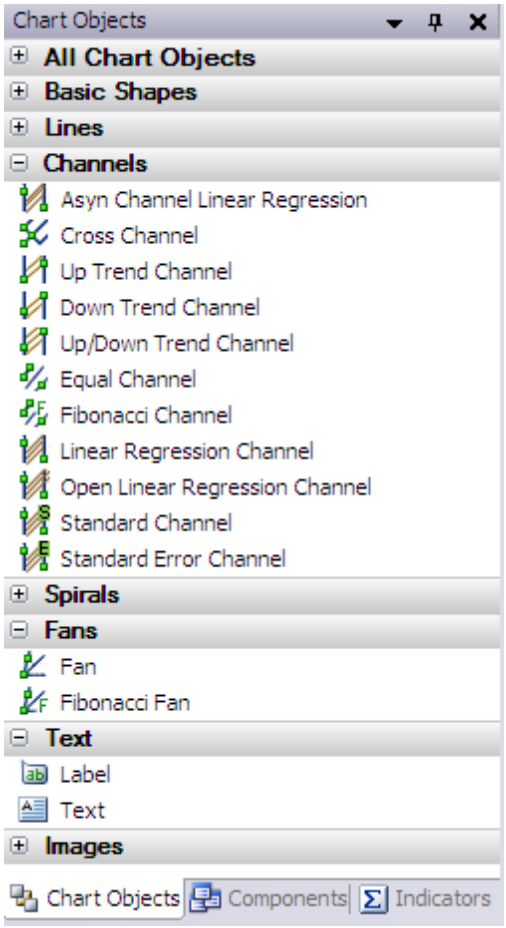

To place a chart object, first, open a chart and select the desired object from the list. Drag and object onto the chart and release the mouse button. If an object requires one or more points to complete plotting, this will be indicated by a crosshair cursor. Move the mouse cursor to the next point and click the left mouse button. Continue this process until all required points are plotted.

See Also

Using the RightEdge Environment
Chart Objects Pane

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14 Chart Objects

RightEdge ships with the following chart objects (alphabetically):

- Archimedes Spiral
- Arrow Line
- Asynchronous Linear Regression Channel
- Circle
- Cross Channel
- Downtrend Channel
- Ellipse
- Equal Channel
- Equal Cycle Line
- Fan
- Fibonacci Fan
- Fibonacci Circle
- Fibonacci Cycle Line
- Horizontal Line
- Hyperbolic Spiral
- Image
- Label
- Line
- Lituus Spiral
- Logarithmic Spiral
- Linear Regression Line
- Linear Regression Channel
- Multi Arc
- Open Linear Regression Line
- Parabolic Spiral
- Parallelogram
- Percent Line
- Rectangle
- Rectangle Band
- Rectangle Price
- Rounded Rectangle
- Sine Object
- Square Cycle Line
- Standard Channel
- Standard Error Channel
- Symmetry Line
- Text
- Triangle
- Up/Down Trend Channel
- Up Trend Channel
- Vertical Line

See Also

Using Chart Objects

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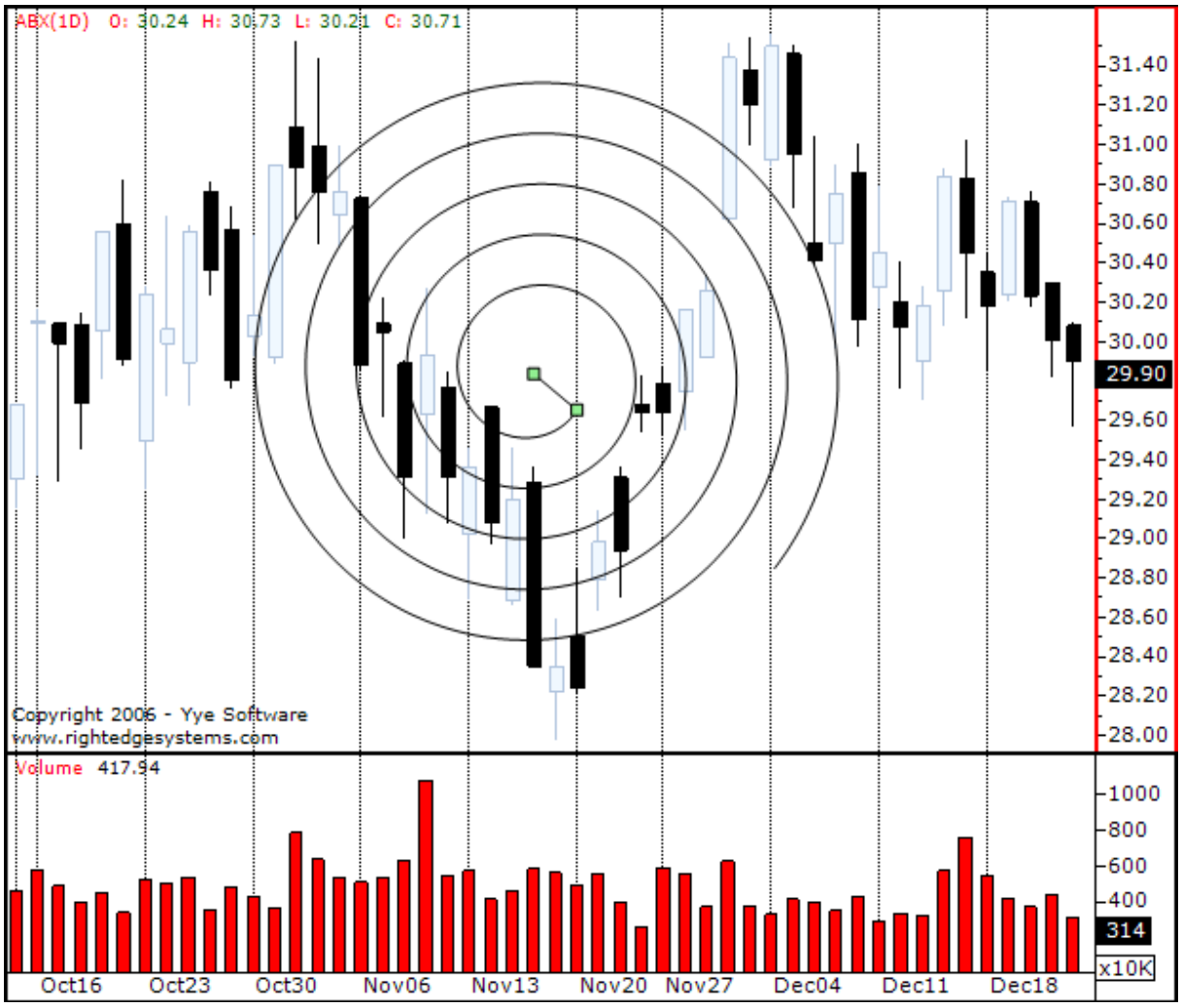
Chart Objects Pane

14.1 Chart Objects Archimedes Spiral

This Archimedes spiral is distinguished from the logarithmic spiral by the fact that successive turnings of the spiral have a constant separation distance, while in a logarithmic spiral these distances form a geometric progression.

To draw an Archimedes spiral, select the object from the Chart Objects Pane and drop it on to an open chart.



There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

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Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Sweep Angle Sets the angle of the end point of this spiral. A sweep angle of 360, for example, will indicate that the spiral will complete one revolution.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.2 Chart Objects Arrow Line

This object is simply a line that can be drawn in any direction. The end of the line has an arrow cap. The line can be rotated so that the arrow points in any direction.

To draw an arrow line, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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14.3 Chart Objects Asynchronous Linear Regression Channel

A classic statistical problem is to try to determine the relationship between two random variables. The Linear Regression line displays the statistically predicted price value.

To draw this object, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end

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of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.4 Chart Objects Circle

This object is simply an ordinary or basic circle that can be placed anywhere on the chart.

To draw a circle, select the object from the Chart Objects Pane and drop it on to an open chart.

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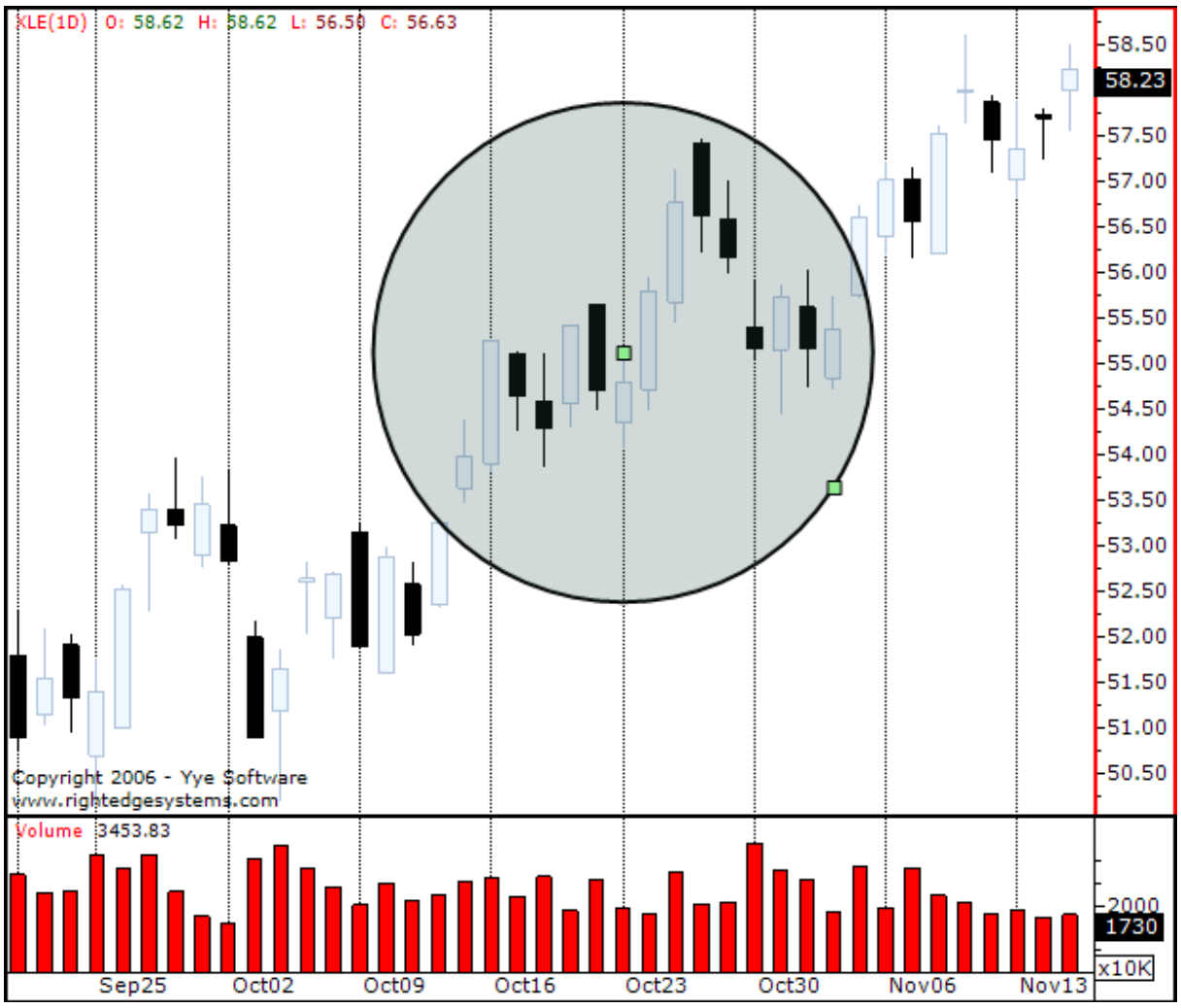

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this circle will be filled. If not filled, the circle's interior will be transparent.

Fill Transparency Indicates the level of transparency for the circle's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the circle is filled. Ignored if the Filled is set to False.

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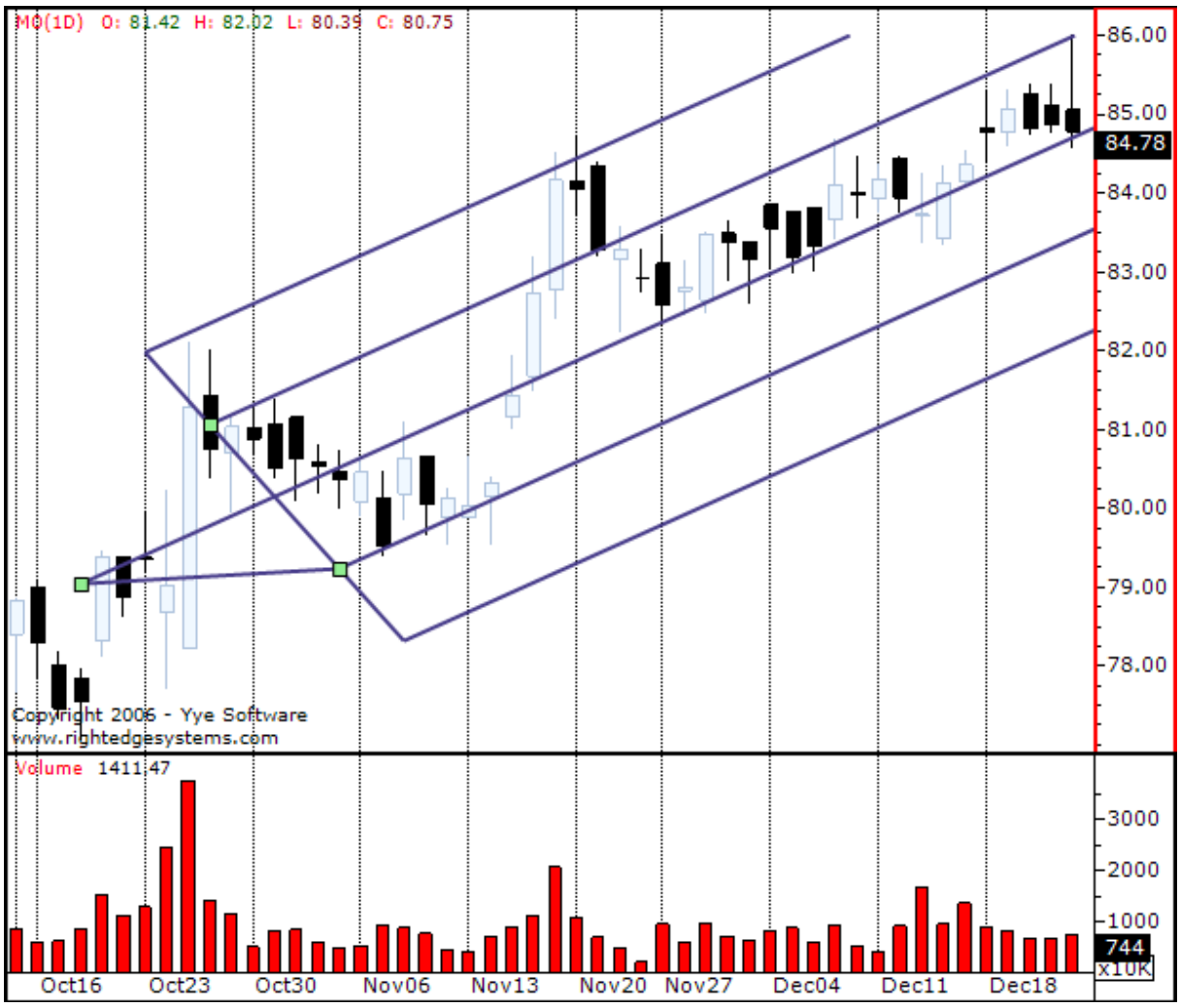
See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.5 Chart Objects Cross Channel

This object is a free form channel that does not take any chart data into consideration. The anchor point (the first point) controls the direction of the channel lines. The second and third points control the width of the channels in relation to one another.

To draw a cross channel, select the object from the Chart Objects Pane and drop it on to an open chart.



There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

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Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Count This sets the number of lines drawn out from the center line. In the example above, this is set to 2 to give a total of 5 lines (1 center line, 2 lines above, 2 lines below).

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.6 Chart Objects Downtrend Channel

This object is not a free form channel. It uses the price data on the chart to determine the direction of the lines. The first point is the left point. The second point specifies the right point of the channels.

To draw a downtrend channel, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

Show Aux Line The auxiliary line are vertical lines that are drawn at either end of the

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start and end points. Select True to display these lines.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.7 Chart Objects Ellipse

This object is simply an ordinary or basic ellipse that can be placed anywhere on the chart.

To draw an ellipse, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this ellipse will be filled. If not filled, the ellipse's interior will be transparent.

Fill Transparency Indicates the level of transparency for the ellipse's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the ellipse is filled. Ignored if the Filled is set to False.

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See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.8 Chart Objects Equal Channel

This object is a free form channel that does not take any chart data into consideration. The first point is the anchor point. The second point controls the horizontal orientation of the channels. The final point specifies the vertical span of the channels.

To draw an equal channel, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

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Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.9 Chart Objects Equal Cycle Line

Draws a set of lines that are the same distance from each other vertically. The distance is set by the initial two points. For example, if the distance between point 1 and point 2 is 5, there will be lines drawn at position 0, 5, 10, 15, 20, 25, etc.

To draw an equal cycle line, select the object from the Chart Objects Pane and drop it on to an open chart.

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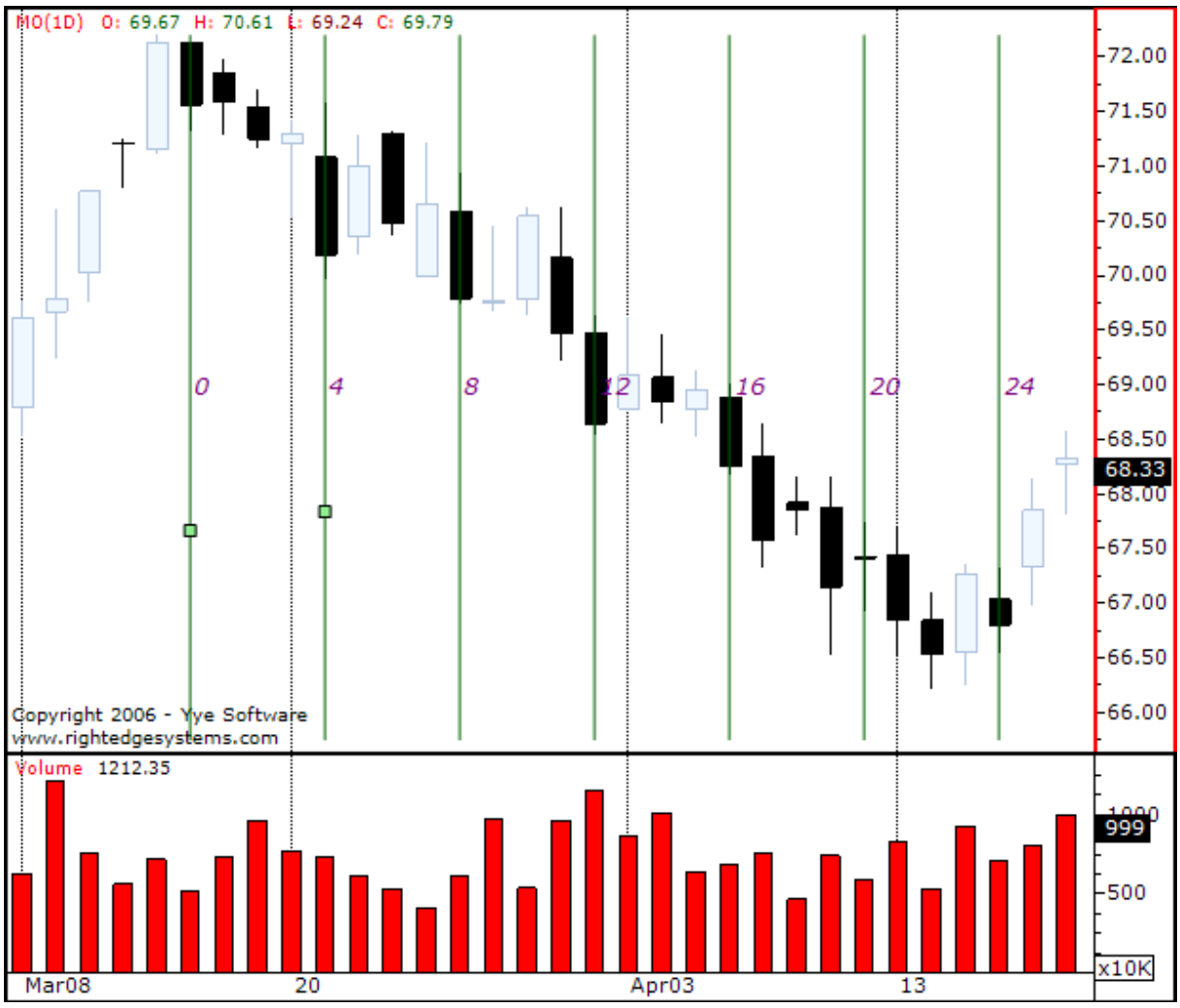

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Line Alignment Specifies the alignment of the cycle lines in relation to the chart edges.

Line Text Specifies the format of the line number text. If Show Text is set to False, this setting is ignored.

Max Lines Sets the maximum number of cycle lines to be drawn.

Show Text Set this to True to show the cycle line text. False to hide the text.

Text Alignment The alignment of the text relative to the cycle line.

Text Color The color of the cycle line text.

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Text Font The font used to draw the cycle line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.10 Chart Objects Fan

Draws three lines in a "fan" formation. Point 1 is the anchor point. Point 2 dictates the top most fan line.

To draw a fan, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

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Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.11 Chart Objects Fibonacci Circle

Draws eleven lines in a circle formation from the anchor point. Point 1 is the anchor point. Point 2 dictates the inner most circle. Subsequent circles are plotted at significant Fibonacci values.

To draw an arrow line, select the object from the Chart Objects Pane and drop it on to an open chart.

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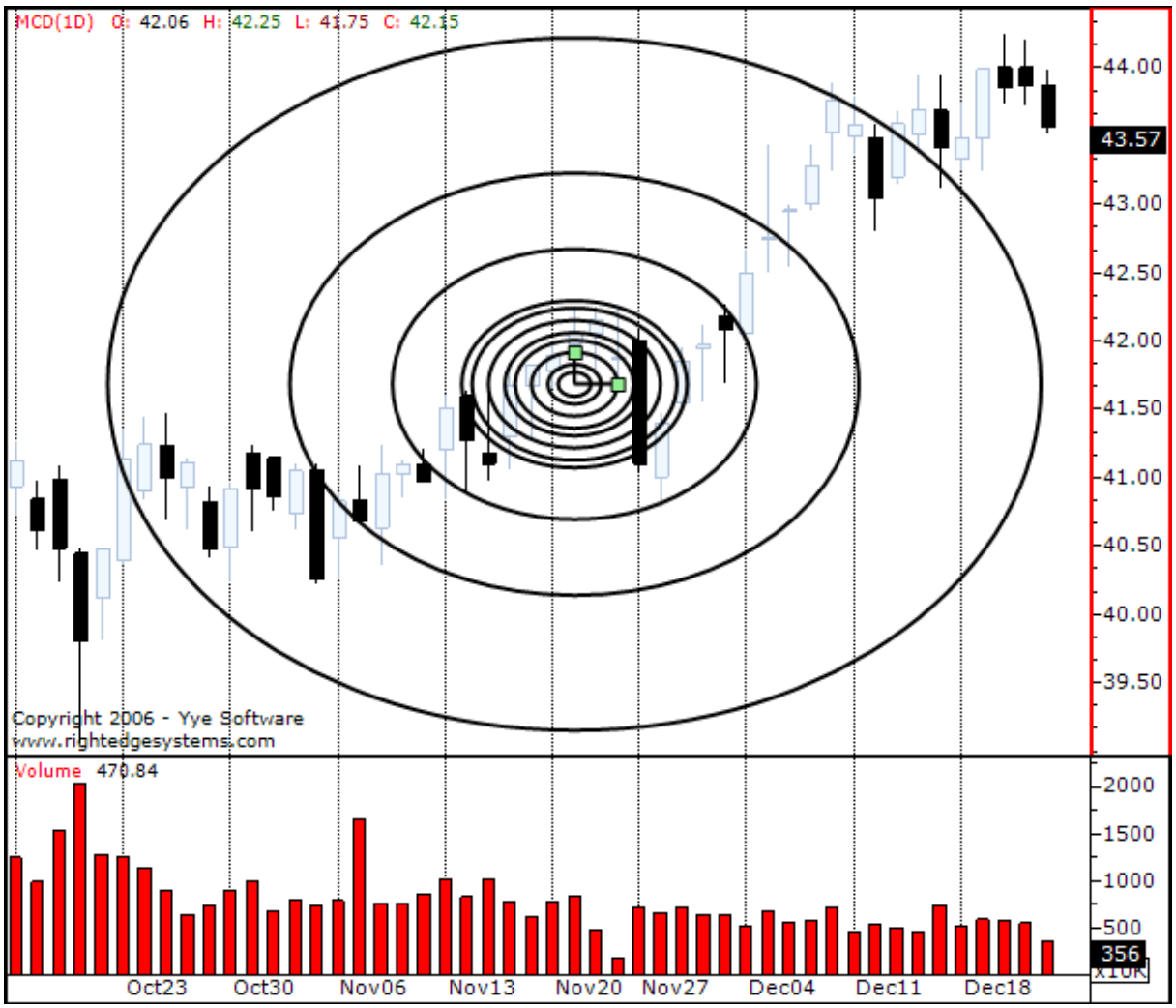

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Frequencies Contains the raw Fibonacci ratios.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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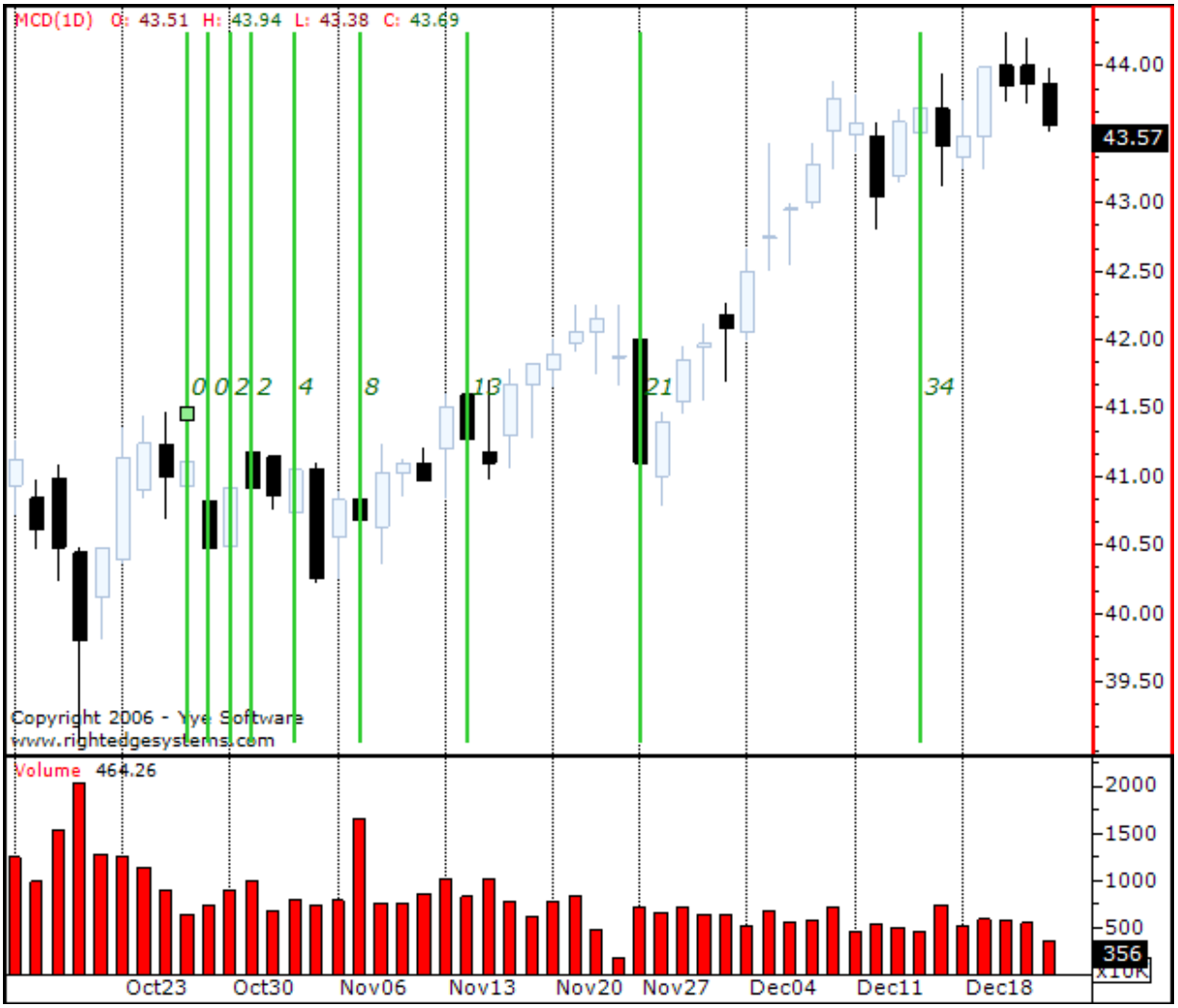
14.12 Chart Objects Fibonacci Cycle Line

Creates a Fibonacci cycle line. Similar to the equal cycle line except for the fact that the lines are drawn using Fibonacci values instead of equal numbers.

To draw a Fibonacci cycle line, select the object from the Chart Objects Pane and drop it on to an open chart.



There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Line Alignment Specifies the alignment of the cycle lines in relation to the chart edges.

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Line Text Specifies the format of the line number text. If Show Text is set to False, this setting is ignored.

Max Lines Sets the maximum number of cycle lines to be drawn.

Show Text Set this to True to show the cycle line text. False to hide the text.

Text Alignment The alignment of the text relative to the cycle line.

Text Color The color of the cycle line text.

Text Font The font used to draw the cycle line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.13 Chart Objects Fibonacci Fan

Draws six lines in a "fan" formation from the anchor point. Point 1 is the anchor point. Point 2 dictates the top most fan line. Subsequent lines of the fan are plotted at significant Fibonacci values.

To draw a Fibonacci fan, select the object from the Chart Objects Pane and drop it on to an open chart.

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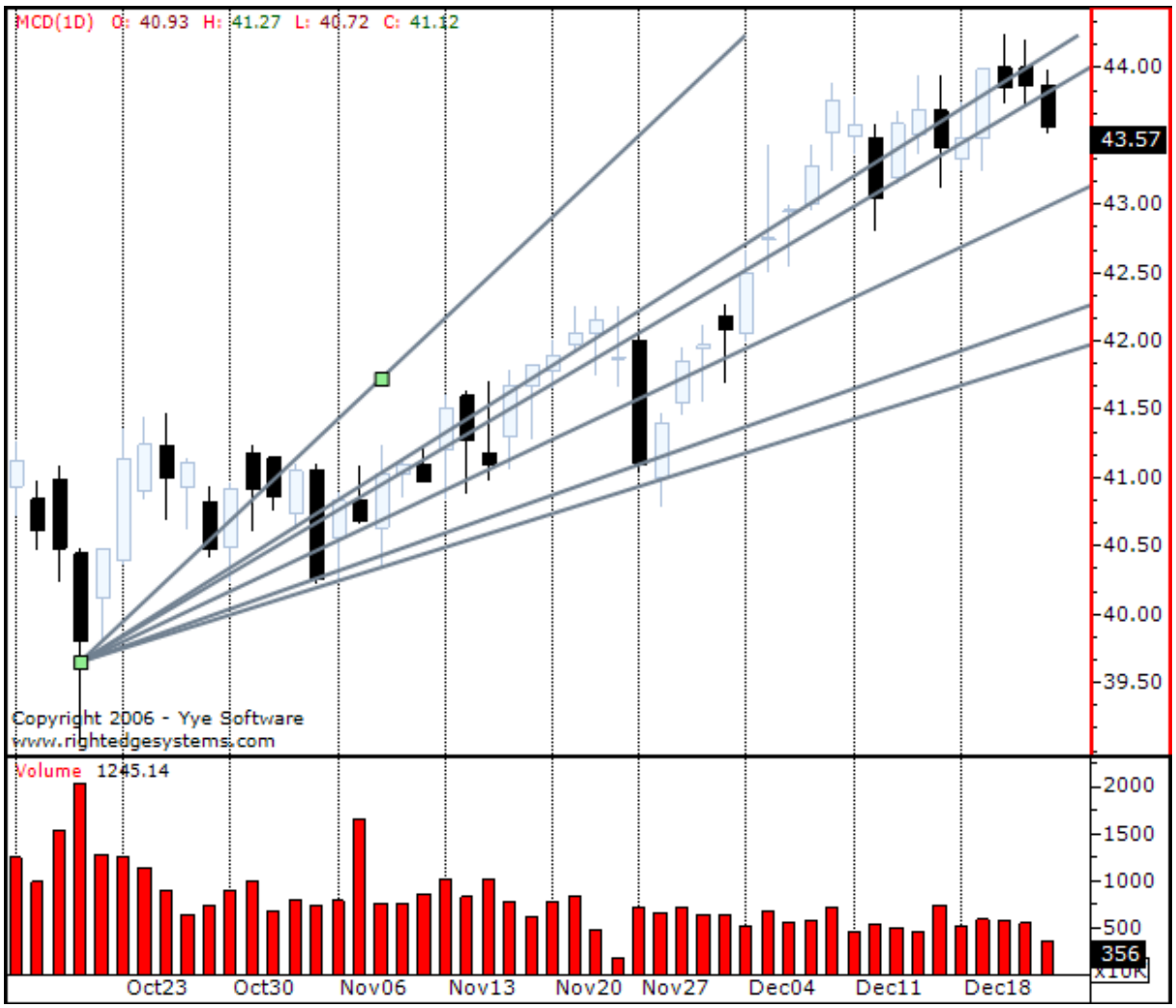

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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14.14 Chart Objects Horizontal Line

This object is a horizontal line that can only be moved vertically.

To draw a horizontal line, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Alignment Specifies the alignment of the line in relation to the chart edges.

Line Text Specifies the format of the line number text.

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Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Text Alignment The alignment of the text relative to the line.

Text Color The color of the line text.

Text Font The font used to draw the line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.15 Chart Objects Hyperbolic Spiral

The hyperbolic spiral, also called the inverse spiral, originated with Pierre Varignon in 1704 and was studied by Johann Bernoulli between 1710 and 1713. It begins at an infinite distance from the pole in the center, it winds faster and faster around as it approaches the pole, the distance from any point to the pole, following the curve, is infinite.

To draw an Archimedes spiral, select the object from the Chart Objects Pane and drop it on to an open chart.

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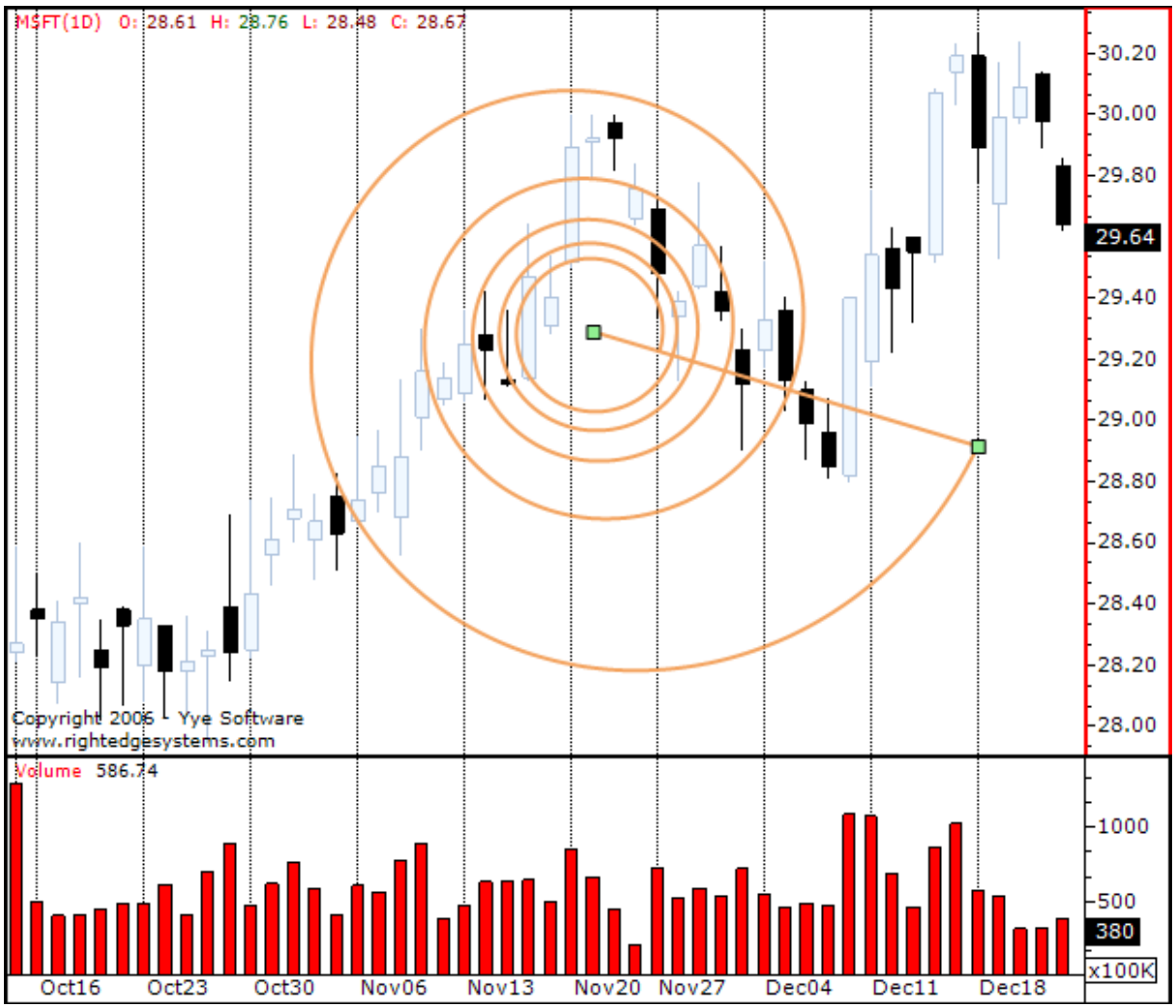

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Sweep Angle Sets the angle of the end point of this spiral. A sweep angle of 360, for example, will indicate that the spiral will complete one revolution.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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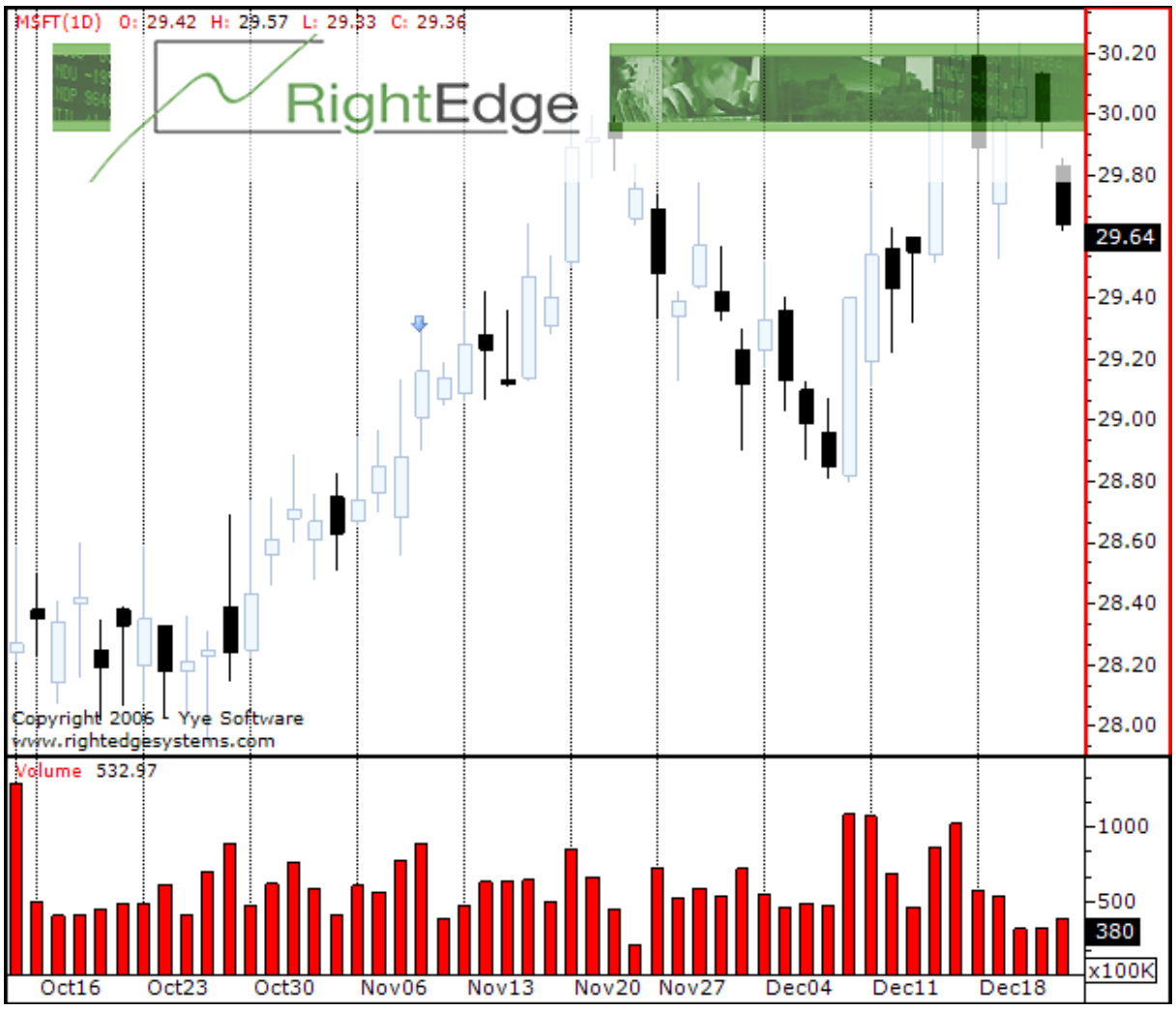
14.16 Chart Objects Image

Draws an image file on to the chart.

To place an image on a chart, select the object from the Chart Objects Pane and drop it on to an open chart. Once the image object is dragged, a filename will need to be specified.



There are appearance aspects of this object that can be changed in the Properties Pane.

Image Alpha The alpha blending value for the image. Valid numbers are 0-255, where 0 is invisible or completely blended with the background and 255 indicates no blending with the background.

Image Filename The fully qualified path of the image file to be displayed on the chart.

Resizable Set this flag to True to allow a user to resize the image, or False to keep it at it's normal size.

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See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.17 Chart Objects Label

This object is used to draw labels on to the chart.

To place a label on the chart, select the Label object from the Chart Objects Pane and drop it on to an open chart. An entry field will immediately be placed where the object was dropped. Begin typing text here.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

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Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width Not applicable to this object.

Transparency The level of transparency given to the text. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Label Alignment Sets the alignment relative to the stick.

Label Text The literal text for this text object.

Label Font Font used to draw the text for this text object.

Label Transparency Sets the transparency value of the label bubble.

Round Width Sets the number of pixels used when rounding the label bubble. A higher number of pixels equates to a rounder edge.

Shadow Width The label bubble has a shadow drawn around the edges. This produces a 3D effect. To increase the shadow size, select a higher value.

Stick Length Describes the length of the area between the point and actual label text. Increasing this values will lengthen this area.

Text Background Color Sets the color of the bubble's background.

Text Color Sets the color of the text within the label bubble.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.18 Chart Objects Line

This object is simply a line that can be drawn in any direction. The end of the line has no cap. The line can be rotated so that the arrow points in any direction.

To draw a simple line, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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14.19 Chart Objects List

RightEdge ships with the following chart objects (alphabetically):

- Archimedes Spiral
- Arrow Line
- Asynchronous Linear Regression Channel
- Circle
- Cross Channel
- Downtrend Channel
- Ellipse
- Equal Channel
- Equal Cycle Line
- Fan
- Fibonacci Fan
- Fibonacci Circle
- Fibonacci Cycle Line
- Horizontal Line
- Hyperbolic Spiral
- Image
- Label
- Line
- Lituus Spiral
- Logarithmic Spiral
- Linear Regression Line
- Linear Regression Channel
- Multi Arc
- Open Linear Regression Line
- Parabolic Spiral
- Parallelogram
- Percent Line
- Rectangle
- Rectangle Band
- Rectangle Price
- Rounded Rectangle
- Sine Object
- Square Cycle Line
- Standard Channel
- Standard Error Channel
- Symmetry Line
- Text
- Triangle
- Up/Down Trend Channel
- Up Trend Channel
- Vertical Line

See Also

Using Chart Objects

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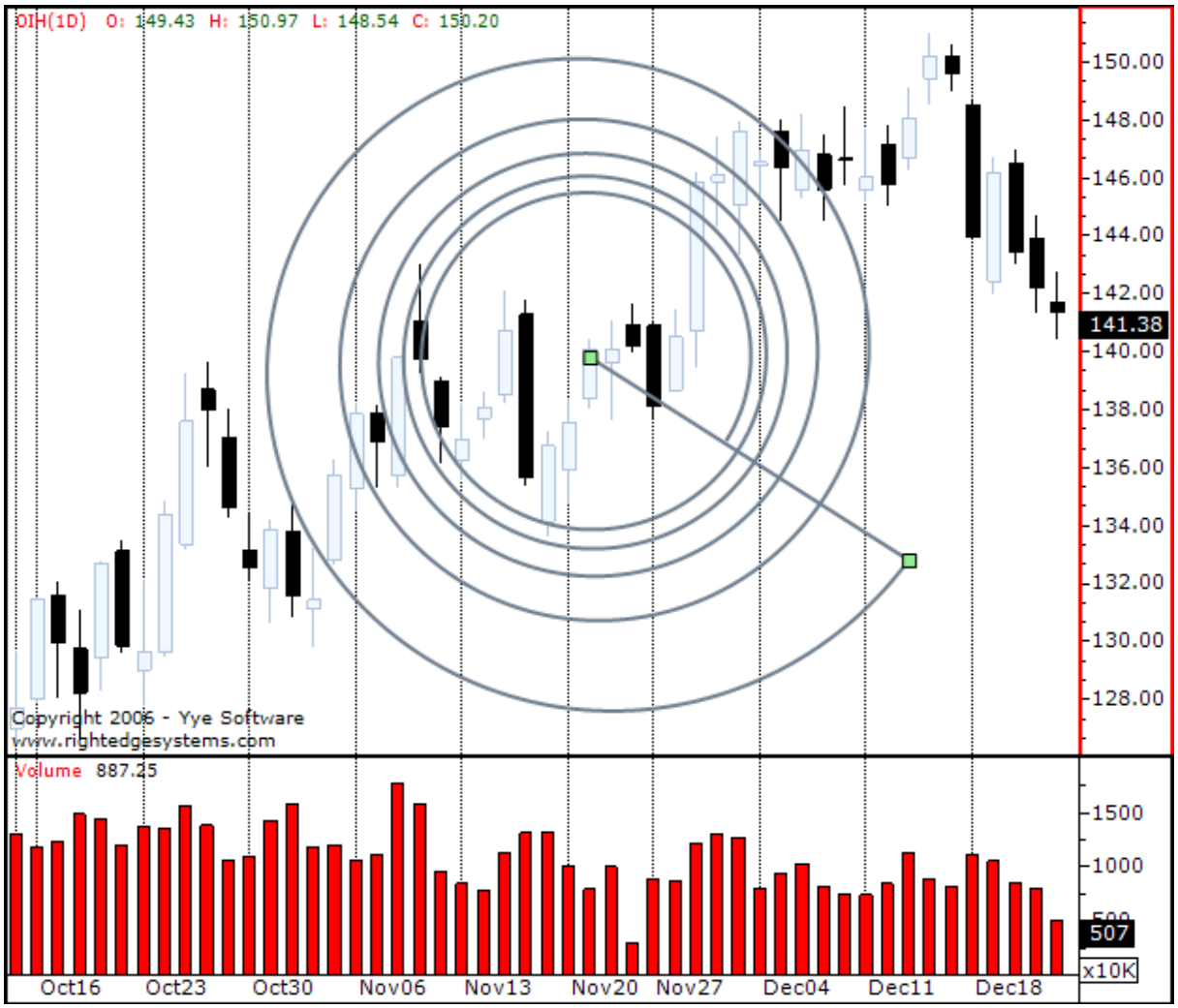
Chart Objects Pane

14.20 Chart Objects Lituus Spiral

According to Robert C. Yates 1952, the Lituus curve is studied by Roger Cotes in 1722. It is named after an ancient Roman trumpet called lituus. The curve is asymptotic to the positive x-axis, and the other end spiral in towards the pole. As theta approaches infinity, the curve approaches the origin.

To draw a Lituus spiral, select the object from the Chart Objects Pane and drop it on to an open chart.



There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger

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number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Sweep Angle Sets the angle of the end point of this spiral. A sweep angle of 360, for example, will indicate that the spiral will complete one revolution.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.21 Chart Objects Logarithmic Spiral

The logarithmic spiral, also known as the growth spiral, was first studied by Descartes in 1638 and Jakob Bernoulli. This spiral often appears in nature. Probably the most important aspect of the logarithmic spiral is that if we increase the angle ø by equal amounts, the distance r from the poles increases in equal ratios.

To draw a Logarithmic spiral, select the object from the Chart Objects Pane and drop it on to an open chart.

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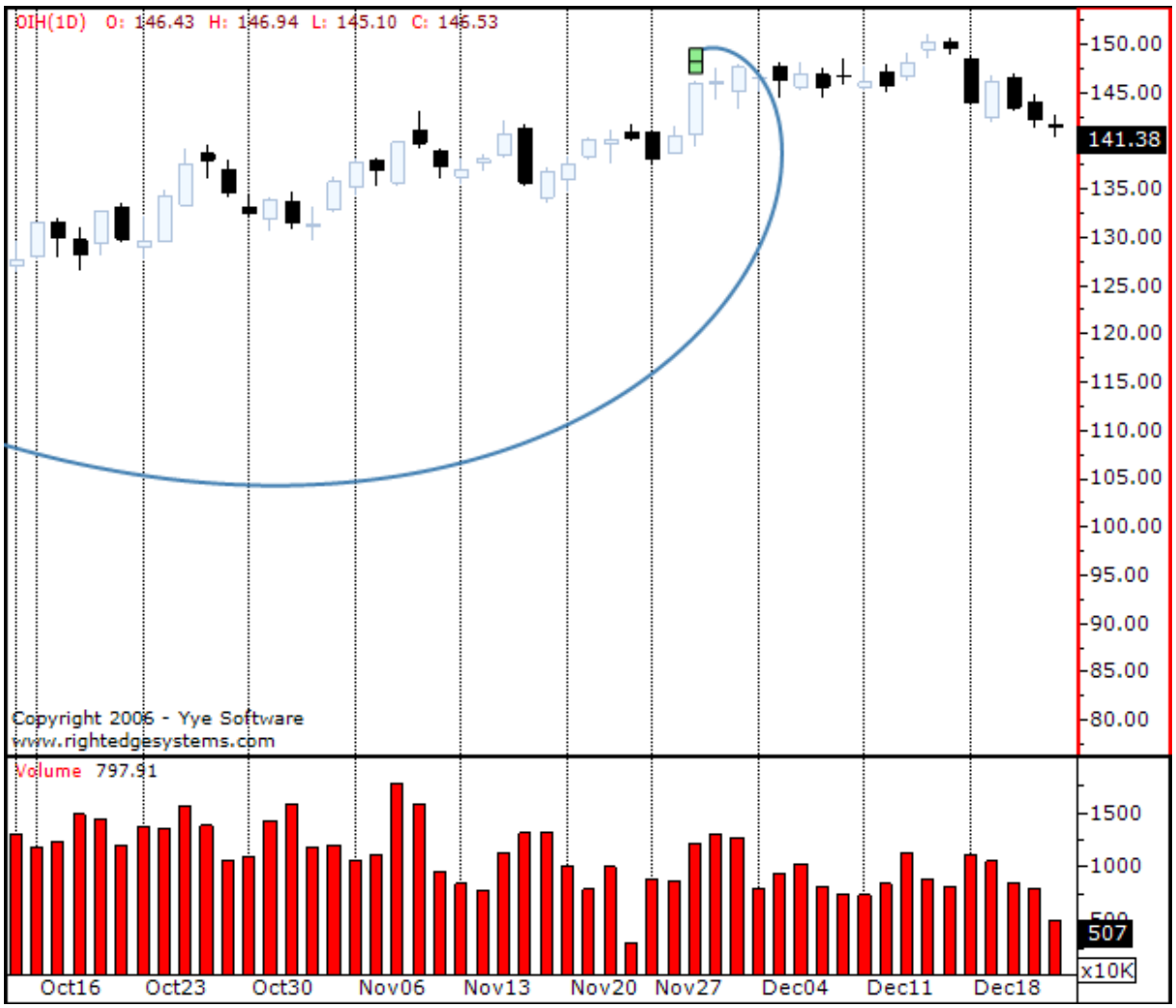

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Sweep Angle Sets the angle of the end point of this spiral.

See Also

Using Chart Objects
Chart Objects Pane
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14.22 Chart Objects Linear Regression Channel

A classic statistical problem is to try to determine the relationship between two random variables. The Linear Regression channel displays the statistically predicted price value.

To draw this object, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

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Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.23 Chart Objects Linear Regression Line

A classic statistical problem is to try to determine the relationship between two random variables. The Linear Regression line displays the statistically predicted price value.

To draw this object, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

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Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

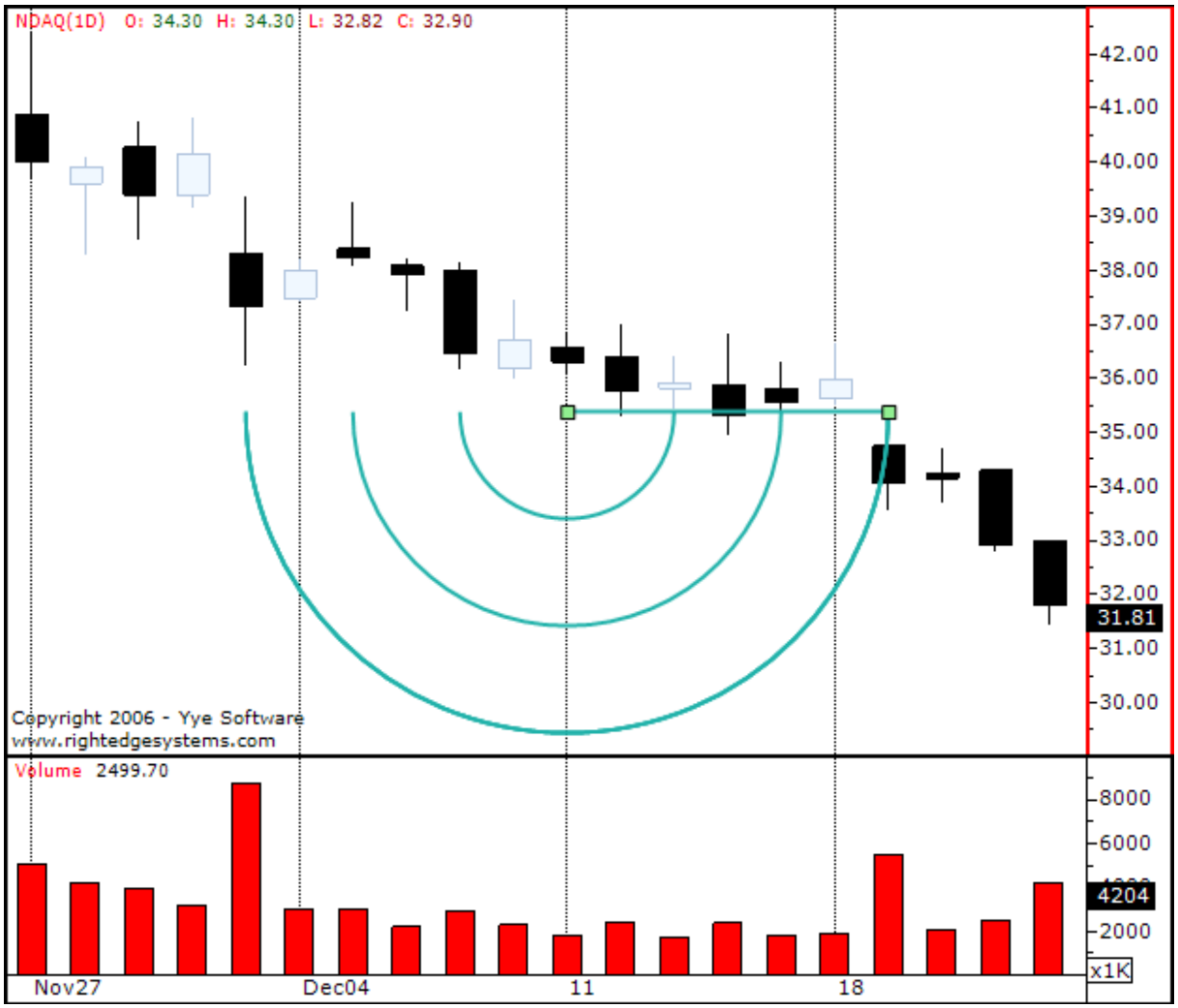
See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.24 Chart Objects Multi Arc

Draws one or more arcs on an existing chart window.

To draw an arc, select the object from the Chart Objects Pane and drop it on to an open chart. Move the arm of the arc to the lower 50% of the arc to draw the arc down. Move the arm of the arc above the higher 50% of the arc to draw the arc up.



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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Frequencies Set up to five separate arcs. To display one arc, set all values to the same number.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.25 Chart Objects Linear Regression Line

A classic statistical problem is to try to determine the relationship between two random variables. The Linear Regression line displays the statistically predicted price value.

To draw this object, select the object from the Chart Objects Pane and drop it on to an open chart. This object is the same as the Linear Regression Line object except for the fact that the line is open.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

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Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.26 Chart Objects Parabolic Spiral

A parabolic spiral can be represented by the mathematical equation r2 = a2. This spiral discovered by Bonaventura Cavalieri creates a curve commonly known as a parabola.

To draw a Parabolic spiral, select the object from the Chart Objects Pane and drop it on to an open chart.

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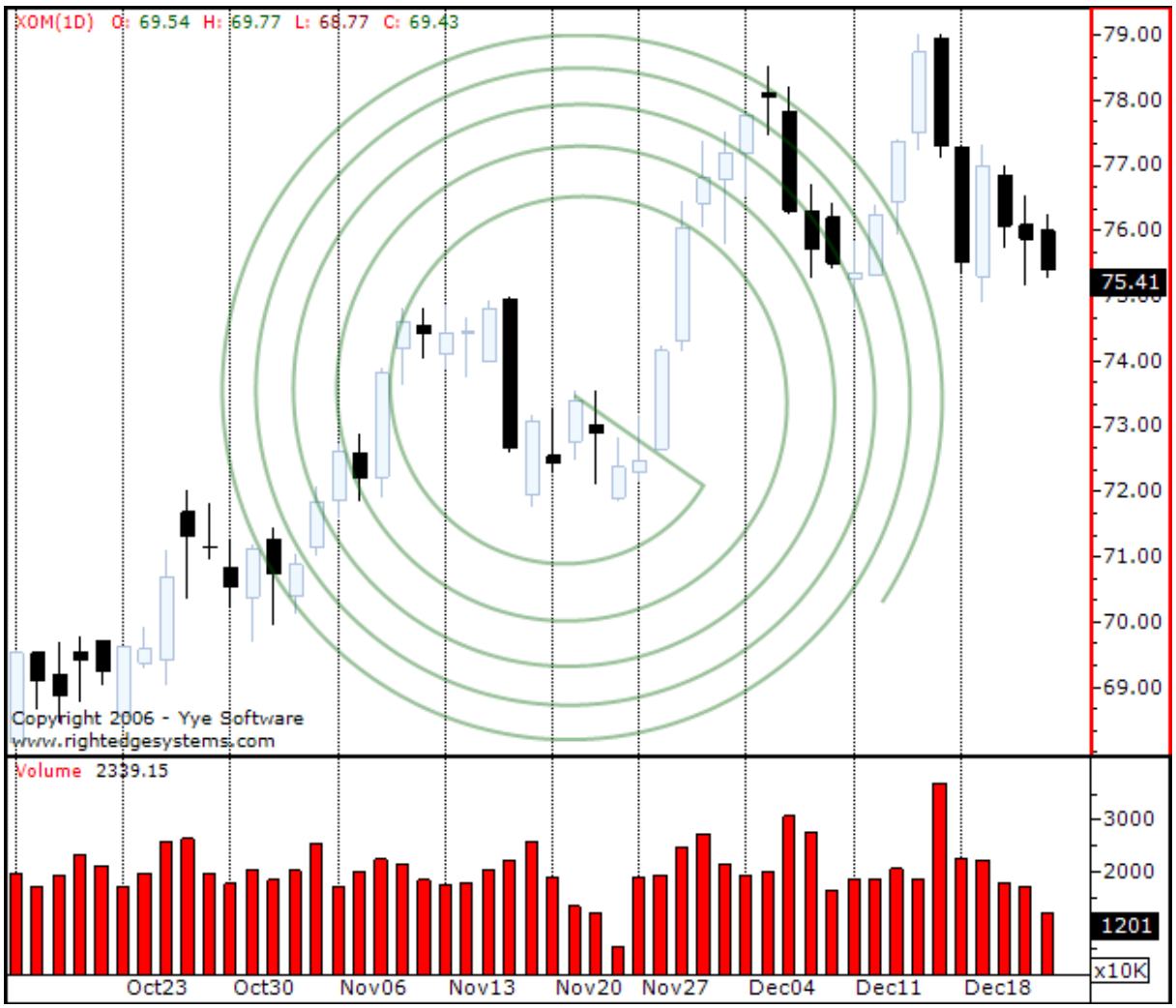

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Sweep Angle Sets the angle of the end point of this spiral. A sweep angle of 360, for example, will indicate that the spiral will complete one revolution.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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14.27 Chart Objects Parallelogram

This object plots a parallelogram or a quadrilateral with opposite sides parallel.

To draw a parallelogram, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

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Filled Indicates whether or not this parallelogram will be filled. If not filled, the parallelogram's interior will be transparent.

Fill Transparency Indicates the level of transparency for the parallelogram's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the parallelogram is filled. Ignored if the Filled is set to False.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.28 Chart Objects Percent Line

This object plots a percent line or percent level retracement. These levels are created by drawing a trend line between two extreme points and then dividing the vertical distance by round percentage values of 25%, 50%, 75% and 100%.

To draw a Percent Line, select the object from the Chart Objects Pane and drop it on to an open chart.

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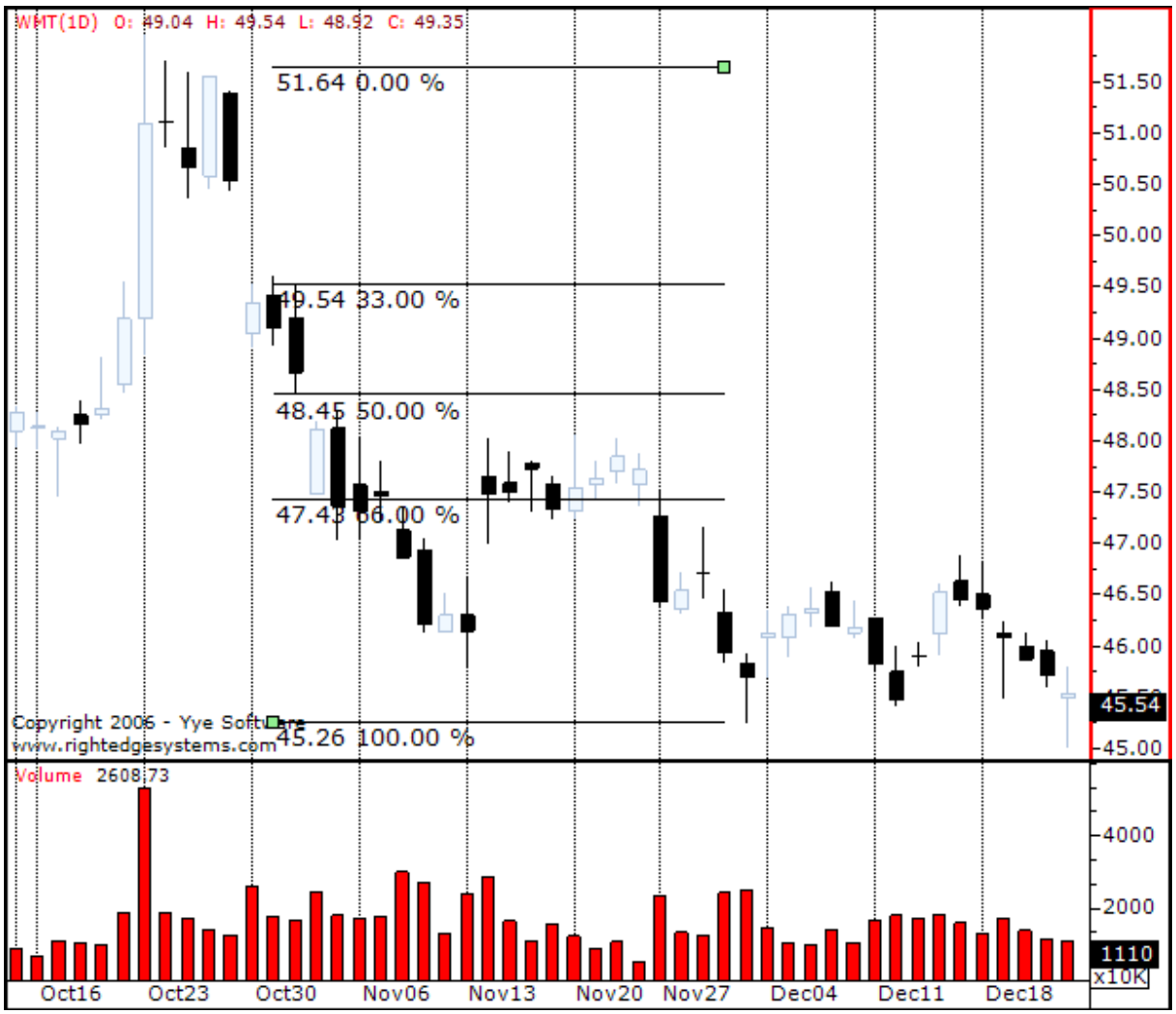

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Frequencies Manually set the five retracement levels.

Line Text Specifies how the text drawn at each retracement line is formatted.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

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Text Alignment The alignment of the text relative to the line.

Text Font The font used to draw the line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.29 Chart Objects Rectangle

This object plots a simple rectangle. The start and end points for this rectangle object are free form and not restricted in any way.

To draw a rectangle, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this rectangle will be filled. If not filled, the rectangle's interior will be transparent.

Fill Transparency Indicates the level of transparency for the rectangle's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the rectangle is filled. Ignored if the Filled is set to False.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.30 Chart Objects Rectangle Band

This object plots a rectangle band. A rectangle band is a rectangle where the top and bottom segments of the rectangle are open. Only the right and left portions of the rectangle are specified.

To draw a rectangle band, select the object from the Chart Objects Pane and drop it on to an open chart.

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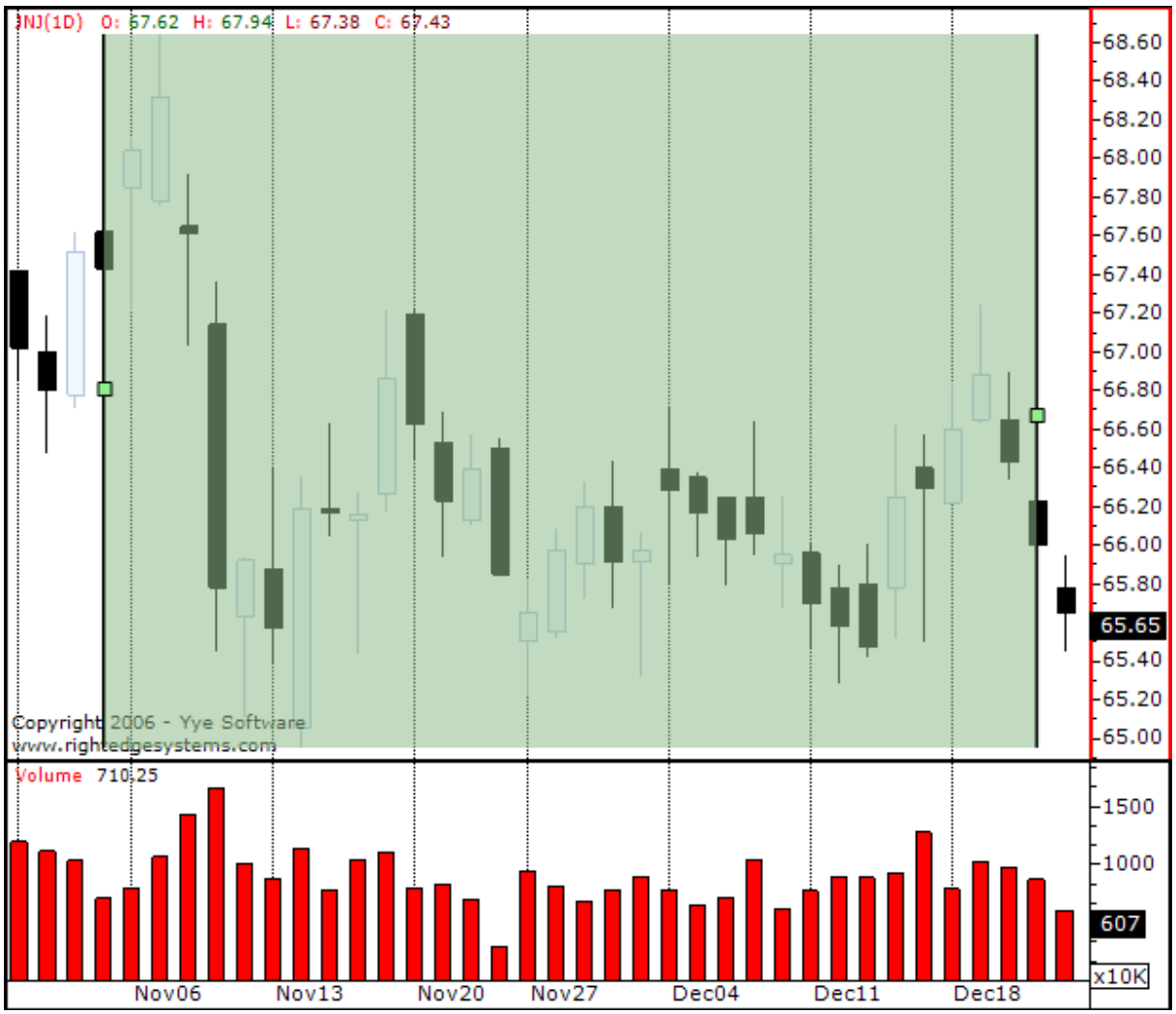

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this rectangle band will be filled. If not filled, the rectangle band's interior will be transparent.

Fill Transparency Indicates the level of transparency for the rectangle band's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the rectangle band is filled. Ignored if the Filled is set to False.

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See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.31 Chart Objects Rectangle Price

This object plots a price rectangle. A price rectangle is a rectangle where the top and bottom segments of the rectangle snap to the top and bottom prices visible on the charts. Only the right and left portions of the rectangle are specified.

To draw a price rectangle, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

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Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this rectangle band will be filled. If not filled, the rectangle band's interior will be transparent.

Fill Transparency Indicates the level of transparency for the rectangle band's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the rectangle band is filled. Ignored if the Filled is set to False.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.32 Chart Objects Rounded Rectangle

This object plots a simple rectangle with rounded corners. This rectangle is identical to the simple rectangle except that the corners will be rounded.

To draw a rounded rectangle, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this rounded rectangle will be filled. If not filled, the rounded rectangle's interior will be transparent.

Fill Transparency Indicates the level of transparency for the rounded rectangle's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the rounded rectangle is filled. Ignored if the Filled is set to False.

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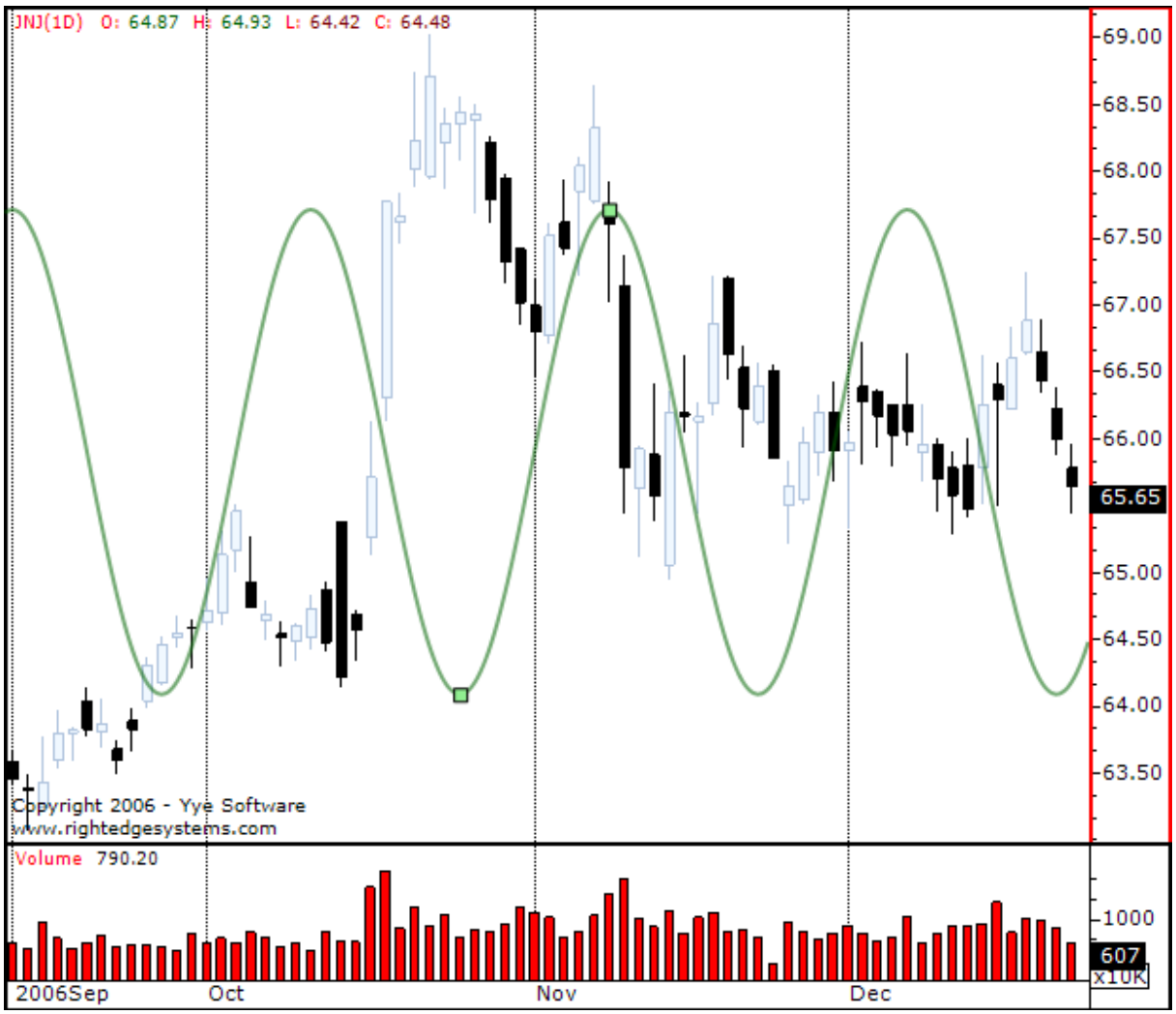
See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.33 Chart Objects Sine Object

A geometric waveform that oscillates (moves up, down or side-to-side) periodically, and is defined by the function y = sin x. It is an s-shaped, smooth wave that oscillates above and below zero. The two points that are used for the sine wave object specify the top portion of the wave and the bottom portion of the wave.

To draw a sine object, select the object from the Chart Objects Pane and drop it on to an open chart.



There are appearance aspects of this object that can be changed in the Properties Pane.

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Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.34 Chart Objects Square Cycle Line

Draws a set of lines that push further apart through the passage of time. The algorithm used to calculate this distance is the bar index squared ($index^2$). The beginning bar is considered index 1.

To draw a square cycle line, select the object from the Chart Objects Pane and drop it on to an open chart.

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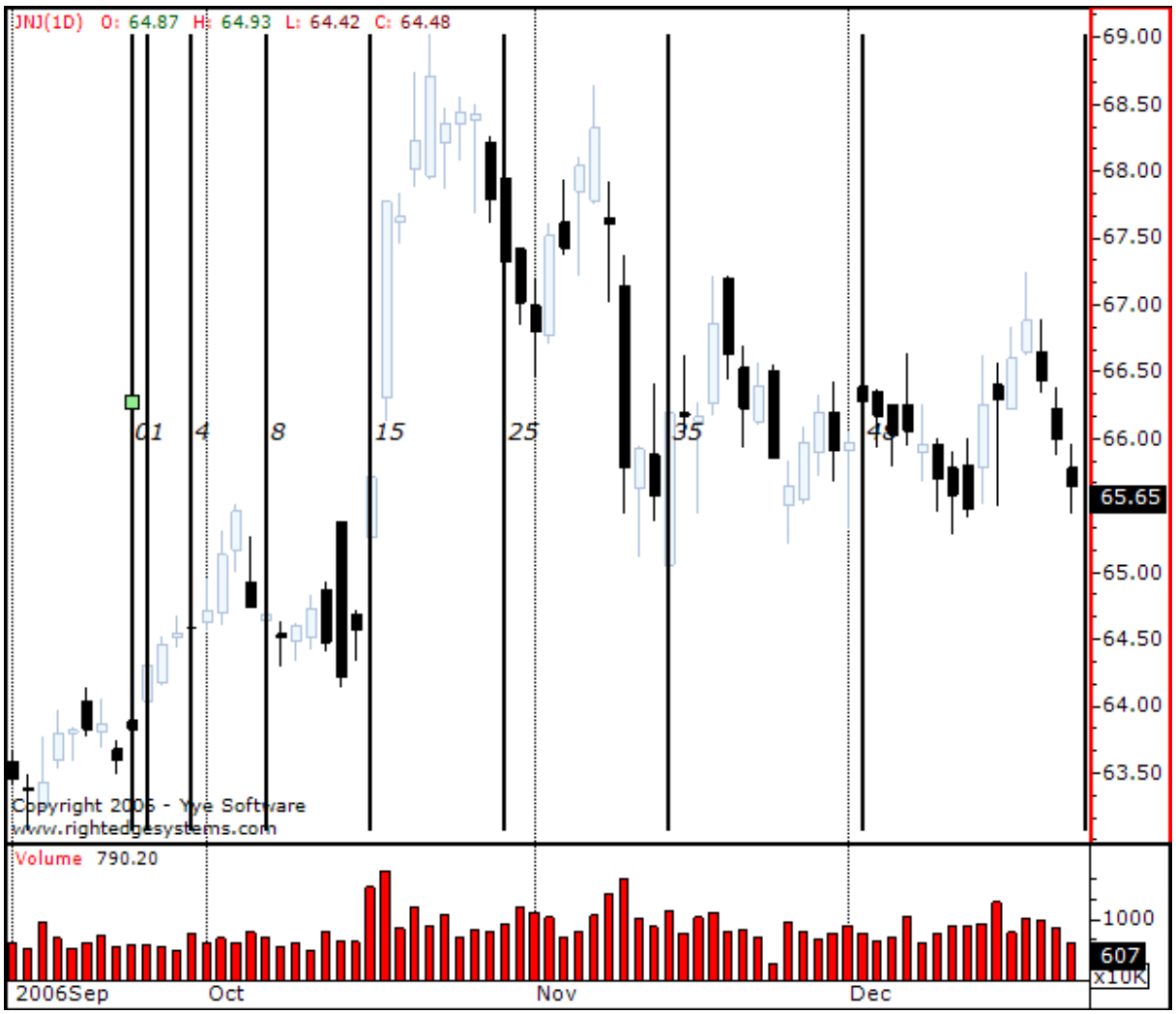

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Line Alignment Specifies the alignment of the cycle lines in relation to the chart edges.

Line Text Specifies the format of the line number text. If Show Text is set to False, this setting is ignored.

Max Lines Sets the maximum number of cycle lines to be drawn.

Show Text Set this to True to show the cycle line text. False to hide the text.

Text Alignment The alignment of the text relative to the cycle line.

Text Color The color of the cycle line text.

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Text Font The font used to draw the cycle line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.35 Chart Objects Standard Channel

This object is not a free form channel. It uses the standard calculation to determine the direction of the lines. The first point is the left point. The second point specifies the right point of the channels.

To draw this object, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

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Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

Show Aux Line The auxiliary line are vertical lines that are drawn at either end of the start and end points. Select True to display these lines.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.36 Chart Objects Standard Channel

This object is not a free form channel. It uses the standard error calculation to determine the direction of the lines. The first point is the left point. The second point specifies the right point of the channels.

To draw this object, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

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Show Aux Line The auxiliary line are vertical lines that are drawn at either end of the start and end points. Select True to display these lines.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.37 Chart Objects Symmetry Line

A symmetry line is a group of lines that are placed equidistant from one another. The 0 line is placed first. Then either from the right or left of the 0 line, the symmetry lines can be pulled to place them equidistant from the center.

To draw a symmetry line object, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Alignment Specifies the alignment of the line in relation to the chart edges.

Line Text Specifies the format of the line number text.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

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Text Alignment The alignment of the text relative to the line.

Text Color The color of the line text.

Text Font The font used to draw the line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.38 Chart Objects Text

This object is used to draw solid or transparent text on to the chart.

To place text on the chart, select the Text object from the Chart Objects Pane and drop it on to an open chart. An entry field will immediately be placed where the object was dropped. Begin typing text here.

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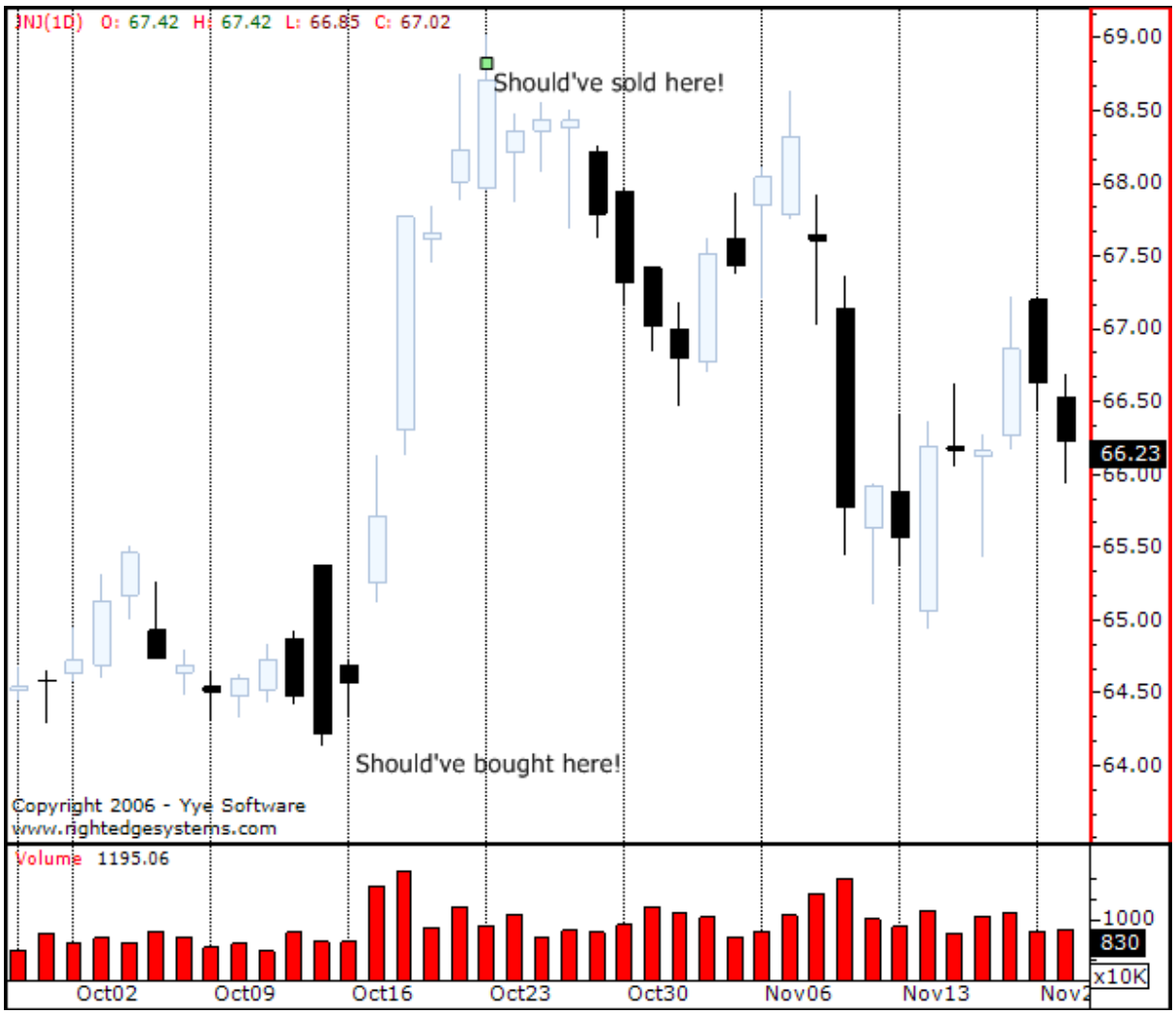

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width Not applicable to this object.

Transparency The level of transparency given to the text. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Text Color Changes the color of the text.

Label Text The literal text for this text object.

Label Font Font used to draw the text for this text object.

See Also

Using Chart Objects
Chart Objects Pane

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Chart Objects List

14.39 Chart Objects Triangle

This object plots a simple triangle. The start and end points for this triangle object are free form and not restricted in any way. This object requires three points, so it will be necessary to click three times (once for each point) to properly plot this object.

To draw a triangle, select the object from the Chart Objects Pane and drop it on to an open chart.

There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger

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number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Filled Indicates whether or not this triangle will be filled. If not filled, the triangle's interior will be transparent.

Fill Transparency Indicates the level of transparency for the triangle's interior. Ignored if Filled is set to False.

Fill Color Specifies the color that will be used when the triangle is filled. Ignored if the Filled is set to False.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.40 Chart Objects Up/Down Trend Channel

This object is not a free form channel. It uses the price data on the chart to determine the direction of the lines. The first point is the left point. The second point specifies the right point of the channels.

To draw an up/down trend channel, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

Show Aux Line The auxiliary line are vertical lines that are drawn at either end of the

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start and end points. Select True to display these lines.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.41 Chart Objects Uptrend Channel

This object is not a free form channel. It uses the price data on the chart to determine the direction of the lines. The first point is the left point. The second point specifies the right point of the channels.

To draw a downtrend channel, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

Percentage The percentage that the up or down lines are drawn away from the center line.

Show Aux Line The auxiliary line are vertical lines that are drawn at either end of the

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start and end points. Select True to display these lines.

Show Center Line Indicates whether or not the center line will be drawn.

Show Down Line Indicates whether or not the lower line will be drawn.

Show Up Line Indicates whether or not the upper line will be drawn.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

14.42 Chart Objects Vertical Line

This object is a vertical line that can only be moved vertically.

To draw a vertical line, select the object from the Chart Objects Pane and drop it on to an open chart.

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There are appearance aspects of this object that can be changed in the Properties Pane.

Color Changes the color of the object.

Smoothing Mode Sets the drawing type of this object. Default draws a normal line. Anti-alias draws a smoother line at the expense of drawing performance.

Width This sets the size of the pen used to draw the outline of this object. A larger number indicates a thicker line.

Transparency The level of transparency given to this object. Valid numbers are 0-255, where 0 is invisible or completely transparent and 255 indicates no transparency.

Line Alignment Specifies the alignment of the line in relation to the chart edges.

Line Text Specifies the format of the line number text.

Open End Indicates whether or not the end lines are open, or will continue until the end of the chart.

Open Start Indicates whether or not the start lines are open, or will continue until the beginning of the chart.

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Text Alignment The alignment of the text relative to the line.

Text Color The color of the line text.

Text Font The font used to draw the line text.

See Also

Using Chart Objects
Chart Objects Pane
Chart Objects List

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15 Plugins & Services

15.1 Service & Plugin Overview

RightEdge is designed to be extensible and customizable. Many parts of RightEdge's functionality are provided by plugins, which allows you to modify or replace them according to your needs. There are different types of plugins for accessing market data, connecting to a broker, calculating indicators, displaying system results, and more. Plugins are .NET classes which implement an interface defined by RightEdge corresponding to the type of the plugin.

Plugin Types

RightEdge supports the following plugin types:

- **Data storage**
  A data storage plugin allows a developer to control the way data is stored by RightEdge. RightEdge ships with a proprietary binary data store and a SQL Server data store. If a developer wanted to support their own proprietary data store or a database not supported out of the box, implementing a data store would allow for seamless integration into RightEdge.
- **Indicators**
  Indicator plugins are for developers who wish to implement their own indicators. Every indicator in RightEdge is a plugin. Everything that is shown in the RightEdge user interface as it relates to indicators is available to third party developers as well. All available indicators are displayed in the Indicator panel.
- **Frequencies**
  Frequency plugins aggregate price data (in the form of ticks and/or bars) to create bar series. RightEdge includes frequency plugins to generate time-based bars, tick bars, and constant volume bars. There is also a frequency plugin that generates daily bars but filters out any data outside of the specified market hours.
- **Risk Assessment**
  Risk assessment plugins are implemented by those developers who want to perform portfolio level risk analysis after a simulation is complete. RightEdge ships with a number of risk assessment plugins such as Profit Factor and Sharpe Ratio, but developers who want to apply their own proprietary calculations can do so by implementing this plugin type. All available risk assessment plugins are displayed in the Options dialog.
- **Actions**
  Actions, as used in the drag and drop interface of RightEdge, are implemented as plugins. Custom action code can be developed by implementing an action plugin. Action plugins are shown in the Components panel.
- **Triggers**
  Triggers, as used in the drag and drop interface of RightEdge, are implemented as plugins. Custom trigger code can be developed by implementing a trigger plugin. Trigger plugins are shown in the Components panel.
- **Optimization**
  Optimization plugins can run multiple simulations of a system with different parameter values to search for an optimal set of parameter values according to some measurement (for example, the best combination of high profit and low risk). RightEdge's default

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optimization plugin allows you to specify the high and low values and the step size or number of steps for each parameter.

- **Watchlist**
  A watchlist plugin can replace the default RightEdge watchlist with its own UI.

- **Services**
  A service is a special type of plugin that typically interface with third party APIs such as data providers and brokers. Services are associated with symbols in the Watchlist pane. You can set up a hierarchical folder structure and have child folders inherit settings from their parents (or override those settings).

  Service plugins implement the IService interface, and can provide one or more of the following services:

  - **Bar Data Retrieval**
    To retrieve bar data from a proprietary source that is not currently supported by RightEdge, implement a bar data retrieval plugin. When this interface is implemented, the service must let RightEdge know that it is capable of retrieving bar data by returning true from the BarDataAvailable property.

  - **Tick Data Retrieval**
    To retrieve tick level data from a proprietary source that is not currently supported by RightEdge, implement a tick data retrieval plugin. When this interface is implemented, the service must let RightEdge know that it is capable of retrieving tick data by returning true from the TickDataAvailable property.

  - **Broker Connectivity**
    RightEdge interfaces with live brokers. A service plugin can implement broker level services to communicate with any broker that will allow communication with a third party application. When implementing broker services, the service must let RightEdge know that it is capable of performing broker services by returning true from the BrokerFunctionsAvailable property.

  - **Symbol Source**
    A symbol source service can provide symbols to add to the watchlist. It will be called when the context (right click) menu is displayed for a watch list folder, and can add items to the "Add Symbols From" submenu. The Yahoo data plugin included with RightEdge provides a symbol source to add symbols from the Dow 30, NASDAQ 100, and S&P 500 indices. The Interactive Brokers plugin provides a symbol source which displays a dialog to search available symbols and add them to the watchlist.

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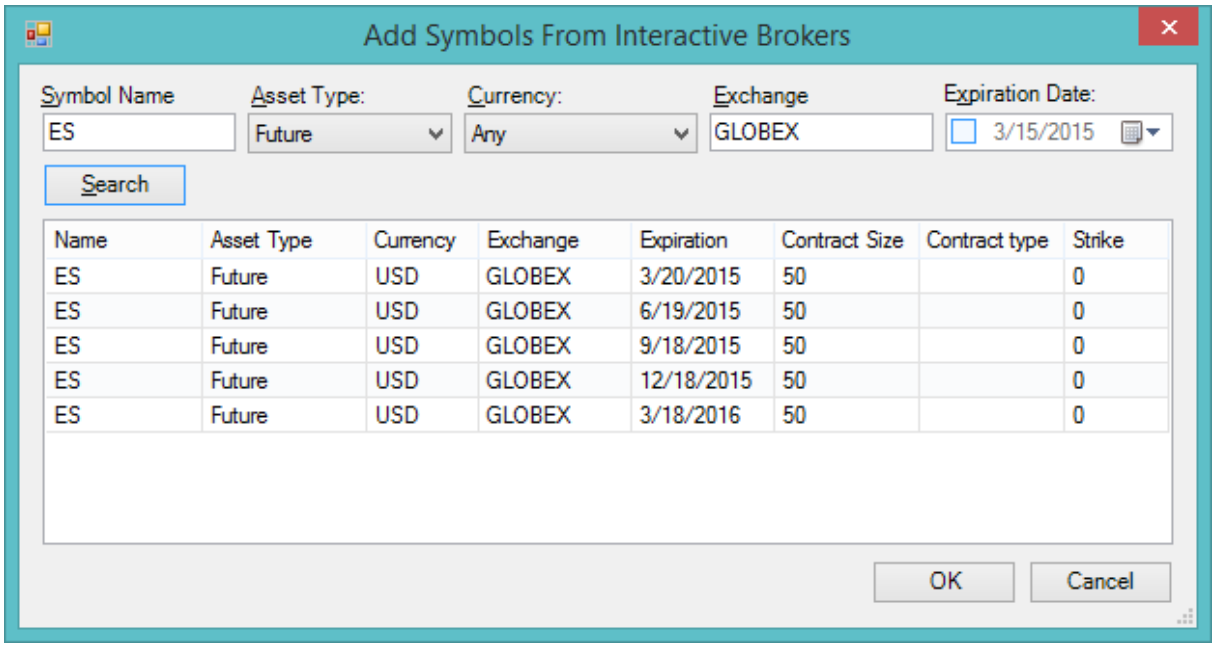

Writing Plugins

Implementing a RightEdge program requires some .NET programming skills, and an environment capable of compiling code into .NET assemblies. A great option is Visual Studio Community, a free edition of Visual Studio.

The easiest way to get started writing a plugin is by modifying code for an existing plugin. You can find sample code for RightEdge plugins by selecting "RightEdge samples" from the RightEdge help menu. The RightEdgePlugins folder contains source code for many of the plugins that are part of RightEdge itself. The C# and VB.NET folders contain various other plugin samples.

To modify a plugin, build it, and use it in RightEdge, follow these steps:

1. Create a copy of the folder with the solution (.sln) file in it. This is so that when you install a new build of RightEdge it won't overwrite the changes you made, and so you will still have the original source code available to refer to.
2. From the copied folder you created, open the solution file in Visual Studio.
3. Make changes to the plugin code.
4. Build the plugin, and copy the output DLL to the Plugins folder under the RightEdge installation directory.

If the plugin you copied was one of the ones included in RightEdge by default, this will copy over the default version. If you want to create a new plugin instead of modifying an existing one, do the following:

1. Change the assembly name of the project. This will change the filename of the DLL that is produced so you can have both the original version and your customized version in the RightEdge plugins directory. To change the assembly name, right click on the project node in the solution explorer and go to the project properties.
2. Change the identity of the plugin. This is what RightEdge uses to uniquely identify each plugin, and if you have multiple plugins with the same identity, at least one of them

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won't be loaded. For service plugins, change the value returned from the id() method. For indicators, triggers, and actions, change the value of the Id property of the RightEdgeObjectAttribute on the plugin class. For other plugin types simply change the name of the plugin class.

3. Change the display name or service name, and other applicable metadata. This will let you distinguish your plugin from the default version of the plugin when selecting which plugin to use in RightEdge. For IService plugins, change the return value for the ServiceName() method. For indicators, triggers, and actions, change the value of the Name property of the RightEdgeObjectAttribute on the plugin class. For other plugins, change the value in the DisplayNameAttribute before the plugin class.
4. If there are other plugins in the same project that you don't want to modify, remove those source files from the project. For example, the DataStorage project has the binary data store plugin, SQL Server plugin, and a Jet data storage plugin. If you just want to customize the binary data store, you should remove the other two plugins from the project so you don't have duplicate versions of them showing up in RightEdge.
5. Build the project and copy the plugin DLL to the RightEdge plugins directory.
6. Configure RightEdge to use the new plugin. How to do this will depend on the plugin type you have implemented. Services can be configured in the Service Setup dialog. Data storage, watchlist, and optimization plugins are configured in the RightEdge options.

Details on the APIs used to implement plugins can be found in the RightEdge developer documentation. The interface for each plugin type to implement is listed below. Service plugins must also implement the IService interface.

Data Storage Plugin	IDataStore
Indicator Plugin	IIndicator or ISeriesCalculator (more details)
Frequency Plugin	FrequencyPlugin
Risk Assessment Plugin	IRiskAssessment, IRiskAssessmentPlugin
Action Plugin	IAction
Trigger Plugin	ITrigger
Bar Data Retrieval Service	IBarDataRetrieval
Tick Data Retrieval Service	ITickRetrieval
Broker Service	IBroker
Symbol Source Service	ISymbolSource
Optimization Plugin	OptimizationPlugin
Watchlist Plugin	IWatchListPlugin

See Also

Creating an Indicator Plugin

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15.2 Creating an Indicator

This topic is intended by software developers that would like to include their own indicators in the RightEdge Indicator Pane.

Implementing plugins requires some programming knowledge. It also requires a programming environment capable of compiling code into .NET library assemblies.

Note: Microsoft provides a free version of their development environment that can be used to create RightEdge plugins. Visit http://msdn.microsoft.com/vstudio/express/ for more information.

1. Launch your version of Visual Studio
2. Select New Project from the File Menu
3. Select Class Library from either the C# or Visual Basic project types. Name the class library MyIndicator. Change the location to the desired folder.
4. Add a reference to RightEdge.Common.
5. Right click on the ***References*** node in the ***Solution Explorer*** and select ***Add Reference...*** Click the ***Browse*** tab and navigate to the RightEdge program directory (C:\Program Files\Yye Software\RightEdge is the default location). Find the Common.dll assembly and double click each one of them to add them.
6. Begin indicator implementation.

There are three base classes that implement IIndicator which aid in implementing an indicator. We'll briefly discuss the benefits of each of these base classes.

IndicatorBase

IndicatorBase is the simplest of all interfaces. This is implemented by an indicator that does not need to look back at previous or support indicator chaining.

SeriesCalculatorBaseSimple

If an indicator is doing a simple calculation on its inputs, you may simply want to calculate the value from the inputs every time the value is requested, instead of storing the entire series of values. If this is the case, you can derive from this class and implement your calculation in the **Item** indexer. This is the recommended base class when backward lookups on previously calculated indicator values are not required.

SeriesCalculatorBaseWithValues

Implements base functionality for an ISeriesCalculator indicator that calculates and stores it's value each time a new bar comes in. When deriving from this class, call the base constructor with the number of inputs required, and implement the CalcNewValue and Reset functions. Use this base class when access to previously calculated data is required and may need to be changed or reset.

Let's implement this indicator using IndicatorBase. To keep the emphasis on implementation as opposed to the details of the indicator itself, we'll implement the average price indicator. Average price is a simple indicator that takes bar data and returns the average of the High, Low and Close values. The math is simple:

```
averagePrice = (high + low + close) / 3.0;
```

Below is the indicator implemented. You can paste the contents right into your environment.

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C#

```
using System;
using System.Collections.Generic;
using System.Text;
using System.Drawing;
using RightEdge.Common;
namespace MyIndicator
{
 [YYEIndicatorAttribute(System.Drawing.KnownColor.Black,
  YYEIndicatorAttribute.EIndicatorGroup.Trend,
  Name = "Average Price Indicator",
  Description = "An average of the bar's high, low and closing prices",
  Id = "{BE86C408-99C2-45bf-BC21-45D2B8623AD0}",
  HelpText = "A simple indicator that takes bar data and returns the averag
 [Serializable]
 public class AveragePriceSample : IndicatorBase
 {
  public AveragePriceSample()
   : base(true)
  {
  }
  public override List CalcSeriesValues(IList bars)
  {
   return base.CalcSeriesValues(bars);
  }
  public override double CalcNextValue(BarData bar)
  {
   if (bar.EmptyBar)
   {
    return double.NaN;
   }
   return (bar.High + bar.Low + bar.Close) / 3.0;
  }
 }
}
```

A few items to note. First, the attributes at the top of the class declaration tell the RightEdge user interface some specific details about this indicator. The first item is the default color proposed to the user whenever they drag and drop this indicator to a chart or System Designer. The next attribute is the group that the indicator will fall under in the user interface. The description is a brief, one sentence bit of information about this indicator. The Id is a unique identifier which allows this indicator to be identified even if the name, version or other attributes are changed. The HelpText attribute is long text describing this indicator in detail. It is recommended that you give an overview of the indicator, its recommended uses and how to interpret the values produced.

Finally, the indicator plugin has been created successfully. Now it must be copied to the RightEdge plugin directory. The plugin directory is located off of the main application directory (specified during the installation). The directory is named "Plugins". After the plugin has been copied to this directory, start RightEdge and the plugin, if implemented properly, will be found and displayed in the proper place in the user interface. No further

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installation is required.

See Also

Plugin Overview
Technical Indicator List
Indicator Pane

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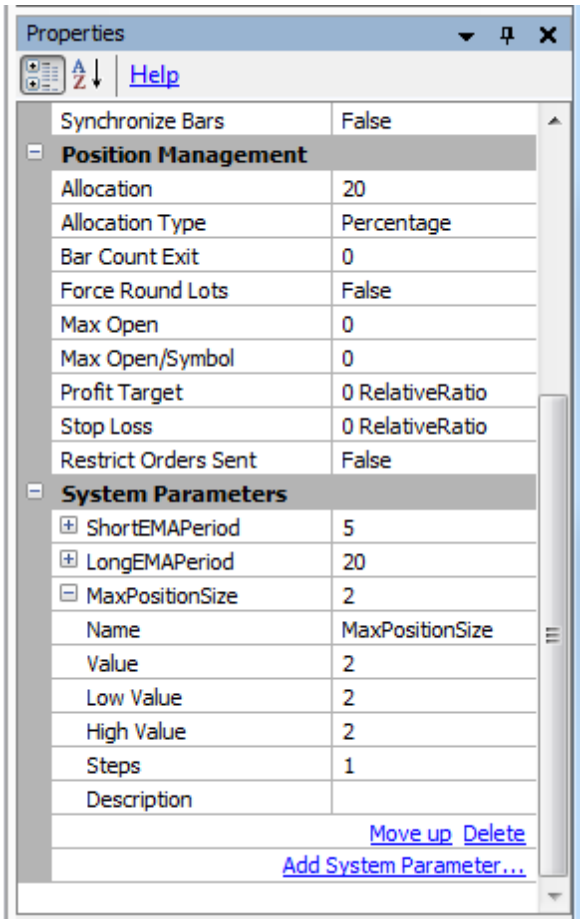
16 Optimization

16.1 Optimization Overview

Optimization is used to test a system with certain variables changed across simulation runs. Running the system with variable parameters or optimization parameters allows the system developer to determine which values result in the most favorable system performance.

Any value in the system can be used as an optimization value. Technical indicators are usually the first candidates since many accept a number of numeric inputs. Other items such as profit targets and stop loss values are also viable candidates.

To begin using optimization in RightEdge, a trading system must be open. In the Project Properties, locate the ***System Parameters*** property.



RightEdge supports any number of parameters in this list. Each value is treated as a type of double. Click the ***Add*** button to add a new empty parameter. Use the property grid on the right to name this parameter and assign a default value.

Referencing Parameters

Once optimization parameters have been added to the project, they may be referenced in

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code. Using the above parameter, stochBuyValue, we will only perform a buy if the StochK indicator is below our optimization parameter.

C#

```
if (stochKValue < SystemParameters["stochBuyValue"])
{
    // Perform buy here.
}
```

Visual Basic

```
If (stochKValue < SystemParameters.Item("stochBuyValue")) Then
    ' Perform buy here.
End If
```

See Also

Optimization Dialog
Optimization Output
Automating RightEdge

16.2 Optimization Output

Optimization is used to test a system with certain variables changed across simulation runs. For more information, see the Optimization Overview topic.

Once optimization runs have been completed, a summary of each run is displayed in the document area.

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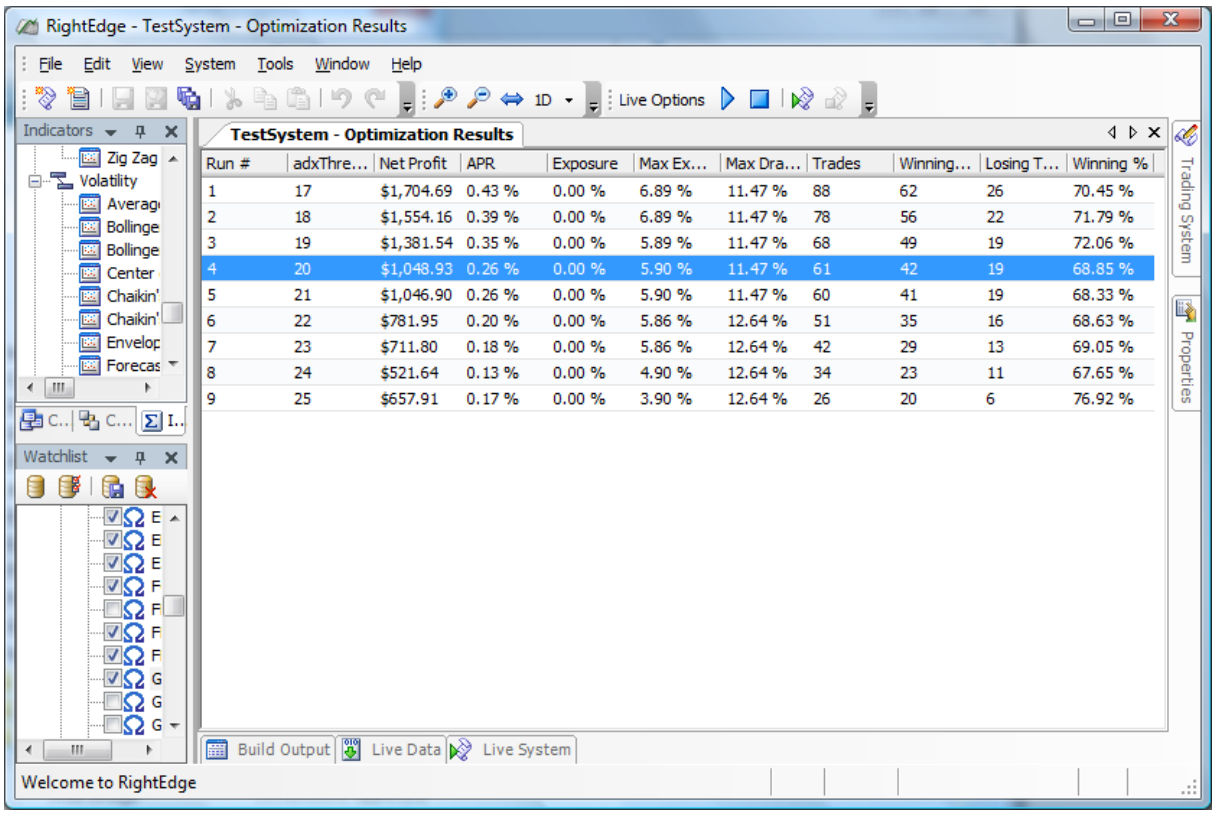

Run #	adxThre...	Net Profit	APR	Exposure	Max Ex...	Max Dra...	Trades	Winning...	Losing T...	Winning %
1	17	$1,704.69	0.43 %	0.00 %	6.89 %	11.47 %	88	62	26	70.45 %
2	18	$1,554.16	0.39 %	0.00 %	6.89 %	11.47 %	78	56	22	71.79 %
3	19	$1,381.54	0.35 %	0.00 %	5.89 %	11.47 %	68	49	19	72.06 %
4	20	$1,048.93	0.26 %	0.00 %	5.90 %	11.47 %	61	42	19	68.85 %
5	21	$1,046.90	0.26 %	0.00 %	5.90 %	11.47 %	60	41	19	68.33 %
6	22	$781.95	0.20 %	0.00 %	5.86 %	12.64 %	51	35	16	68.63 %
7	23	$711.80	0.18 %	0.00 %	5.86 %	12.64 %	42	29	13	69.05 %
8	24	$521.64	0.13 %	0.00 %	4.90 %	12.64 %	34	23	11	67.65 %
9	25	$657.91	0.17 %	0.00 %	3.90 %	12.64 %	26	20	6	76.92 %

Run #

Each run is sequentially numbered. That number is displayed here.

Parameter Value

In the sample above, there is a parameter named "adxThreshold". The parameter name is shown in the column and the value of that parameter for each run is displayed in the cell beneath.

Summary Items

The remaining items in the list are totals pulled from the system run. These are the values for both long and short trades.

Double click any run shown to display the full System Results for the run.

See Also

Optimization Overview
Optimization Dialog

16.3 Optimization Dialog

Optimization is used to test a system with certain variables changed across simulation runs. To run optimization, open or create a trading system. Use the ***System Parameters***

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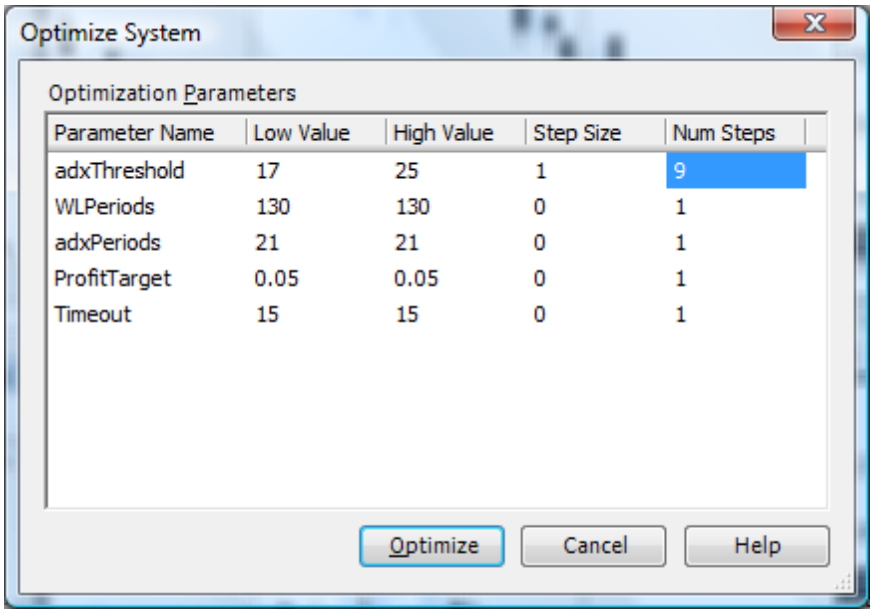
in the Properties pane to create parameters used for optimization. For more information, see the Optimization Overview topic.

Once the optimization parameters are set, select ***Optimize System*** from the ***System*** menu.



Optimization Parameters

This is a list of the parameters set for this system. The values can be set by double clicking the value. Set the value by clicking anywhere outside of that value's space.

Low Value

Each system is run starting from the lowest value. Specify this value for each parameter.

High Value

Optimization stops once the highest value is reached. Specify this value for each parameter.

Step Size

This is the increment size for each optimization value. For example, if the low value is 1 and the high value is 11 with a step size of 2, the system will be run a total of six times.

Number of Steps

This is a calculated value based on all previous entries. This is the number of times the system will be run for this optimization run.

See Also

Optimization Overview
Optimization Output

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17 Technical Indicators

17.1 Technical Indicator Overview

Technical indicators are the very foundation of technical analysis. It may be prudent to first answer the question of technical analysis and then delve into why technical indicators are such an important piece. Technical analysis is one of the methods that is used to help predict the future movement of an asset's price.

Technical analysis can be based on subjective chart patterns that reoccur. Some of the most popular reoccurring chart patterns are the double top, double bottom and head and shoulders. For example, the double top is simply a point where the prices seem to hit a ceiling and bounce off of that ceiling only to hit the ceiling again in a relatively short period of time. This is a sign to a chart reader that the buyers are drying up at the top point and without the ability to break through the top, there is likely a good play to the downside. A person holding a long position in this asset may want to consider selling their holdings to find another play with strong technicals. A riskier speculator may want to take a short position when the asset fails to break through the second peak.

Still another form of subjective technical analysis comes in the form of candle stick charts. Most technical analysts prefer these charts to bar or line charts when representing price data. Some technical traders believe that repeatable patterns exist within the candlesticks themselves. These are known as candlestick patterns.

Subjective chart patterns are difficult to "train" a computer to see. Many of them are conditional based on previous bars and other subjective items within the chart. There have been efforts made to code these patterns in such a way that the computer can identify them, however, it's not a perfect fit.

This makes technical indicators an automated system developers natural choice. An indicator is a self contained algorithm that takes a series of values, performs some computation and returns a single value. Based on the indicator author's direction, the value of the indicator means something. While there is still room for subjective interpretation, a single number is something that can easily be developed against to make decisions.

The simplest of technical indicators is the simple moving average. A simple moving average (SMA) takes the previous prices from an asset and performs a mathematical average. Most of the time, the SMA uses the closing price of the asset in the calculation, however, it is not forbidden to use other parts of the bar (open, high, low) for the calculation.

Most technical indicators take input parameters. In the case of the simple moving average, the parameter is simply number of bars to look back. For a fast moving average line, a period parameter of five would generate lines that close in fairly close step with the actual price. A period parameter of 200 would make the SMA line lag significantly. Some simple technical analysis performed by some would be trend analysis. Since the 200 period SMA lags, a price above a rising 200 day SMA line would be considered bullish. A line below a falling 200 period SMA would would be considered bearish.

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17.2 Accumulation / Distribution

Accumulation Distribution is used to track the relationship between price and volume. A bullish signal is given when the Accumulation/Distribution Line forms a positive divergence. The accumulation distribution line can also be used to confirm the strength of the current trend. If the line trends up during a bull market move, this will confirm a healthy trend. If the line begin to trend down in conjunction with price action, this may be a clear signal that the trend has ended.

See Also

Accumulation / Distribution Developer Help

17.3 Accumulation Swing Index

The accumulation swing index is a variation of the Swing Index indicator. This indicator is typically used as a confirmation indicator, but considered more reliable in determining long term trends than the plain Swing Index since it uses more than the last two bars.

The indicator values for ASI will vacillate around the 0 line when the price is not trending. If the ASI is making higher highs in conjunction with the price, an upward trend may be confirmed. Likewise, if the ASI is making lower lows in conjunction with with the price, this may confirm a down trend.

See Also

Accumulation Swing Index Developer Help

17.4 Add Series

A utility indicator to add two existing indicator series together.

See Also

Add Series Developer Help
Subtract Series
Multiply Series
Divide Series
Shift Series

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17.5 ADX Indicator

This set of indicators, called the Directional Movement system, include DI+, DI-, DX, ADX and ADXR. These indicators were developed by Welles Wilder in his book "New Concepts in Technical Trading Systems". Directional Index (DX) combines the DI+ and DI- to measure the strength of a trend. The stronger the trend, the further the spread between the DI+ and DI- trend lines. ADX is an average, or smoothed version of DX.

See Also

ADX Developer Help
ADXR Indicator
DI+ Indicator
DI- Indicator

17.6 ADXR Indicator

This set of indicators, called the Directional Movement system, include DI+, DI-, DX, ADX and ADXR. These indicators were developed by Welles Wilder in his book "New Concepts in Technical Trading Systems". Directional Index (DX) combines the DI+ and DI- to measure the strength of a trend. The stronger the trend, the further the spread between the DI+ and DI- trend lines.

ADXR is an average, or smoothed version of ADX. This version may cause less whipsaw triggers, but a more lagged response.

See Also

ADXR Developer Help
ADX Indicator
DI+ Indicator
DI- Indicator

17.7 Aroon Down Indicator

The Aroon indicator was developed by Tushar Chande in 1995. Aroon is used to measure the presence and strength of trends. The Aroon Up line and Aroon Down line oscillate between -100 and 100. When the two lines are in close proximity, this indicates a consolidation phase. When the up indicator (Aroon Up) is below 50, the current trend has lost its upward momemtum. The the down indicator (Aroon Down) is below 50, this indicates that a downward trend has lost its momentum.

See Also

Aroon Down Developer Help

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Aroon Up Indicator
Aroon Oscillator Indicator

17.8 Aroon Up Indicator

The Aroon indicator was developed by Tushar Chande in 1995. Aroon is used to measure the presence and strength of trends. The Aroon Up line and Aroon Down line oscillate between -100 and 100. When the two lines are in close proximity, this indicates a consolidation phase. When the up indicator (Aroon Up) is below 50, the current trend has lost its upward momemtum. The the down indicator (Aroon Down) is below 50, this indicates that a downward trend has lost its momentum.

See Also

Aroon Up Developer Help
Aroon Down Indicator
Aroon Oscillator Indicator

17.9 Aroon Oscillator

The Aroon indicator was developed by Tushar Chande in 1995. Aroon is used to measure the presence and strength of trends. The Aroon Up line and Aroon Down line oscillate between -100 and 100. The Aroon Oscillator is Aroon Up minus Aroon Down. A positive value on the oscillator may indicate an upward trend and a negative reading may indicator a bearish trend.

See Also

Aroon Oscillator Developer Help
Aroon Down Indicator
Aroon Oscillator Indicator

17.10 Average Price Indicator

A simple indicator that takes a bar and returns the average of the High, Low and Close values.

See Also

Average Price Developer Help

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17.11 Average True Range Indicator

Average true range is a volatility indicator. High ATR values are often correlated with high volatility as prices bottom and there is a sell off. Low ATR values are often correlated with low volatility as prices stabilize or move into a sideways channel prior to a possible breakout.

See Also

Average True Range Developer Help
True Range Indicator

17.12 Balance of Power Indicator

Based on Igor Livshin's article in the August 2001 issue of Technical Analysis of Stocks and Commodities. According to Livshin, "The balance of power (BOP) indicator measures the strength of the bulls vs. bears by assessing the ability of each to push price to an extreme level." Livshin recommends a 14-period moving average, though the number of periods varies depending on the nature of the market and the time frame. A change in the BOP trend serves as a warning signal and should be confirmed by a change in the price direction.

See Also

Balance of Power Developer Help

17.13 Bollinger Band (Lower) Indicator

Bollinger Bands are a technical trading tool created by John Bollinger in the early 1980s. They arose from the need for adaptive trading bands and the observation that volatility was dynamic, not static as was widely believed at the time.

The purpose of Bollinger Bands is to provide a relative definition of high and low. By definition prices are high at the upper band and low at the lower band. This definition can aid in rigorous pattern recognition and is useful in comparing price action to the action of indicators to arrive at systematic trading decisions.

In some cases, a penetration of the lower band could be considered an oversold condition and a reversal may be forthcoming.

See Also

Bollinger Band (Lower) Developer Help
Bollinger Band (Upper)

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17.14 Bollinger Band (Upper) Indicator

Bollinger Bands are a technical trading tool created by John Bollinger in the early 1980s. They arose from the need for adaptive trading bands and the observation that volatility was dynamic, not static as was widely believed at the time.

The purpose of Bollinger Bands is to provide a relative definition of high and low. By definition prices are high at the upper band and low at the lower band. This definition can aid in rigorous pattern recognition and is useful in comparing price action to the action of indicators to arrive at systematic trading decisions.

In some cases, a penetration of the upper band could be considered an overbought condition and a reversal may be forthcoming.

See Also

Bollinger Band (Upper) Developer Help
Bollinger Band (Lower)

17.15 Center of Gravity Oscillator Indicator

The Center of Gravity Oscillator, by John Ehlers, was first published in Technical Analysis of Stock and Commodities in May 2002. Ehlers claims that this a zero lag oscillator. This oscillator is to be used like an other oscillator. When the fast line crosses through the bottom of the slow line, this indicates a long signal. When the fast line crosses under the slow line, this indicates a sell or short signal. The "fast" line is simply the COG oscillator offset.

See Also

Center of Gravity Oscillator Developer Help

17.16 Chaikin Money Flow Indicator

The Chaikin Money Flow indicator developed by Marc Chaikin, is used to confirm a bullish or bearish trend. This indicator may also be useful to detect reversals when there is divergence between the price and CMF line. Readings of less than 0 are considered bearish. If a stock is in an uptrend with readings below 0, this may be a sign of weakness or an end to the trend. Marc Chaikin considers a reading below -0.25 to be indicative of strong selling pressure. Conversely, a reading above +0.25 is considered to be indicative of strong buying pressure.

See Also

Chaikin Money Flow Developer Help

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17.17 Chaikin Oscillator Indicator

Chaikin's oscillator is a volume indicator based on the Accumulation/Distribution indicator. When there is a divergence between the indicator in the stock price, this may indicate that a trend reversal in price is due. A falling price trend shown in conjunction with a bullish divergence in the oscillator may be a sign that the falling trend is nearly over and the price will reverse. The same is inversely true for a rising price and a falling reading for the oscillator.

See Also

Chaikin Oscillator Developer Help
Accumulation / Distribution Indicator

17.18 Chaikin Volatility Indicator

Chaikin's volatility indicator compares the gap between high and low prices. If the values are high, then prices are changing greatly during the periods. If the values are low, prices are staying steady. High levels indicate market tops while low levels indicate the end of a market bottom.

See Also

Chaikin Volatility Developer Help

17.19 Chande Momentum Indicator

The Chande Momentum Oscillator, developed by Tushar Chande was developed to capture "pure momentum." The CMO is similar to the Relative Strength Index indicator in that it measures both up and down price changes. The CMO values are confined to the -100 and +100 range. This indicator is mainly used to determine extreme overbought or oversold conditions. Tushar Chande identifies that any reading above +50 is overbought and any reading below -50 as oversold.

See Also

Chande Momentum Developer Help
Relative Strength Index

17.20 Commodity Channel Index (CCI) Indicator

Developed by Donald Lambert, the Commodity Channel Index (CCI) was designed to identify cyclical turns in commodities. The indicator measures the position of price in relation to its moving average. The indicator may change direction when the trend is about to change. Critical points are at +100 and -100. Conventional usage is to go long

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if indicator turns up from -100 or below and to go short xif the indicator turns down from +100 or above.

See Also

Commodity Channel (CCI) Developer Help

17.21 Commodity Selection Index (CSI) Indicator

The Commodity Selection Index (CSI) indicator was created by Welles Wilder to help short-term traders select stocks. This indicator brings out commodities that have strong trending and volatility characteristics. In theory, high CSI levels make the most money the fastest.

See Also

Commodity Selection Index (CSI) Developer Help

17.22 Constant Series Indicator

The Constant indicator is a simple a way to draw a straight line on the chart at the specified value or as an input to a trigger in the drag and drop interface.

See Also

Constant Series Developer Help

17.23 Detrended Price Oscillator (DPO) Indicator

The Detrended Price Oscillator (DPO) is used to identify short term cycles. It does so by removing the long term price cycle, leaving the shorter term cycles. Since long term cycles are made up of many shorter term cycles, this indicator can be used to capitalized on shorter term trading. The oscillator is considered most effective using periods of 21 bars or less.

The general rules of thumb are to only open trades in the direction of the trend. Go long when Detrended Price Oscillator crosses below zero and then turns back above. Go short when Detrended Price Oscillator crosses above zero and then turns back below.

See Also

Detrended Price Oscillator (DPO) Developer Help

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17.24 DI+ Indicator

This set of indicators, called the Directional Movement system, include DI+, DI-, DX, ADX and ADXR. These indicators were developed by Welles Wilder in his book "New Concepts in Technical Trading Systems". Directional Index (DX) combines the DI+ and DI- to measure the strength of a trend. The stronger the trend, the further the spread between the DI+ and DI- trend lines.

Consider the DI+ to measure the percentage of upward movement and DI- to measure the percentage of a downtrend. When the DI+ rises above the DI+, this can be considered a bullish signal. A bearish signal occurs when DI+ falls below DI-.

See Also

DIPlus Developer Help
ADX Indicator
ADXR Indicator
DI- Indicator

17.25 DI- Indicator

This set of indicators, called the Directional Movement system, include DI+, DI-, DX, ADX and ADXR. These indicators were developed by Welles Wilder in his book "New Concepts in Technical Trading Systems". Directional Index (DX) combines the DI+ and DI- to measure the strength of a trend. The stronger the trend, the further the spread between the DI+ and DI- trend lines.

Consider the DI+ to measure the percentage of upward movement and DI- to measure the percentage of a downtrend. When the DI+ rises above the DI+, this can be considered a bullish signal. A bearish signal occurs when DI+ falls below DI-.

See Also

DI- Developer Help
ADX Indicator
ADXR Indicator
DI+ Indicator

17.26 Directional Movement Indicator

This set of indicators, called the Directional Movement system, include DI+, DI-, DX, ADX and ADXR. These indicators were developed by Welles Wilder in his book "New Concepts in Technical Trading Systems". Consider the DI+ to measure the percentage of upward movement and DI- to measure the percentage of a downtrend. When the DI+ rises above the DI+, this can be considered a bullish signal. A bearish signal occurs when DI+ falls below DI-.

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See Also

Directional Movement Developer Help
ADX Indicator
ADXR Indicator
DI+ Indicator
DI- Indicator

17.27 Divide Series Indicator

A utility indicator to divide two existing indicator series.

See Also

Divide Series Developer Help
Add Series
Subtract Series
Multiply Series
Shift Series

17.28 Donchian Channel (Lower) Indicator

The Donchian Channel is a trend following breakout system. It is recommended to use the Donchian Channel in trending markets, and as a result can perform poorly in sideways markets. The signals derived from the Price Channel are based on the following basic rules:

- When price closes above the Donchian Channel, buy long and cover short positions.
- When price closes below the Donchian Channel, sell short and liquidate long positions.

The Donchian Channel indicator is not meant to catch tops or bottoms, only trends. Trend traders may want to extend the standard 4 week period to 8 weeks in order to wait for significant trend signals, while others may shorten the period to a more sensitive 1 or 2 weeks for liquidation purposes.

See Also

Donchian Channel (Lower) Developer Help
Donchian Channel (Upper)

17.29 Donchian Channel (Upper) Indicator

The Donchian Channel is a trend following breakout system. It is recommended to use the Donchian Channel in trending markets, and as a result can perform poorly in sideways

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markets. The signals derived from the Price Channel are based on the following basic rules:

- When price closes above the Donchian Channel, buy long and cover short positions.
- When price closes below the Donchian Channel, sell short and liquidate long positions.

The Donchian Channel indicator is not meant to catch tops or bottoms, only trends. Trend traders may want to extend the standard 4 week period to 8 weeks in order to wait for significant trend signals, while others may shorten the period to a more sensitive 1 or 2 weeks for liquidation purposes.

See Also

Donchian Channel (Upper) Developer Help
Donchian Channel (Lower)

17.30 Double Exponential Moving Average Indicator

DEMA was developed by Patrick Mulloy and published in the January 1994 of Technical Analysis of Stocks and Commodities. Moving averages are known for their lag time and the DEMA attempts to remedy this. The calculation consists of a single EMA and a double EMA to smooth out and produce less "head fakes". According to Mr. Mulloy, a DEMA smoothed MACD produces fewer, but more profitable signals as opposed to the traditional EMA smoothed MACD.

See Also

Double Exponential Moving Average (DEMA) Indicator Developer Help
Exponential Moving Average (EMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator
Moving Average Convergence/Divergence (MACD) Indicator

17.31 Dynamic Momentum Index (DMI) Indicator

The Dynamic Momentum Index (DMI) indicator was developed by Tushar Chande and Stanley Kroll. DMI measures volatility. If the underlying asset is volatile, DMI increases its own volatility. DMI, like RSI is considered overbought at readings of 70 or more and oversold at reading of 30 or less. DMI is considered a leading indicator since it can be ahead of RSI by a couple of bars when it reaches overbought or oversold levels. DMI can be used to confirm trends and trade with them. For example, a steady and consistent decrease in the price of the asset coupled with higher lows could be a sign to short sell the lower high on the DMI.

See Also

Dynamic Momentum Index (DMI) Developer Help

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17.32 Ease of Movement Indicator

The Ease of Movement indicator, designed by Richard Arms, highlights the relationship between volume and price changes. Since most breakouts to the up or down side are supposed to be confirmed by volume, using the Ease of Movement indicator will help confirm those breakouts. A buy signal may be flagged when the indicator crosses the zero line to the up side. The sell signal may be given when the indicator line crosses below the zero line.

See Also

Ease of Movement Developer Help

17.33 Envelope (Lower) Indicator

Envelope bands are a simple way to find a "normal" trading range. The upper and lower bands are typically used in conjunction with one another visualize if the current price is trading at the high or low end of its range. A buy signal may be triggered when the price penetrates the lower envelope and a sell or sell short signal may be generated when the upper envelope has been penetrated. Envelopes are calculated by plotting a shifted moving average. The average is shifted up at specified percent for the upper band and shifted down at the specified percent for the lower band.

See Also

Envelope (Lower) Developer Help
Envelope (Upper)

17.34 Envelope (Upper) Indicator

Envelope bands are a simple way to find a "normal" trading range. The upper and lower bands are typically used in conjunction with one another visualize if the current price is trading at the high or low end of its range. A buy signal may be triggered when the price penetrates the lower envelope and a sell or sell short signal may be generated when the upper envelope has been penetrated. Envelopes are calculated by plotting a shifted moving average. The average is shifted up at specified percent for the upper band and shifted down at the specified percent for the lower band.

See Also

Envelope (Upper) Developer Help
Envelope (Lower)

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17.35 Exponential Moving Average (EMA) Indicator

An exponential moving average is a form of a weighted moving average. To construct a 20 day exponential moving average you must first construct a 20 day simple moving average. This simple moving average is the starting point for the exponential moving average. Assume that the simple moving average value for day 20 is 42; the simple moving average value for day 21 is 43; and the simple moving average value for day 21 is 44. We then subtract the day 20 moving average value from day 21 simple moving average value and get a difference of 1.00. This value (1.00) is multiplied by an exponent. In this case, the exponent is .1. We then add .1 to the simple moving average value of day 20. The exponential moving average value of day 20 now becomes 42.100. To calculate the exponent, divide 2 by the time period. In our case, we divided 2 by 20 to arrive at .1.

The exponential moving averages are believed to have higher sensitivity to the current price action, which arguably is more relevant. The quicker signals may come at the risk of more "false" signals. It is recommended that the trading system that utilizes moving averages test with both the simple and exponential to see which one works out best.

See Also

Exponential Moving Average (EMA) Indicator Developer Help
Double Exponential Moving Average (DEMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator
Moving Average Convergence/Divergence (MACD) Indicator

17.36 Forecast Oscillator Indicator

The Forecast Oscillator, by Tuschar Chande, is a percentage difference between the forecast price. The forecast price is nothing more than a linear regression trend line and the actual closing price. The indicator value is greater than zero when the forecast price is greater than the actual price. The inverse is true when the indicator value is less than zero. The unsmoothed value is very choppy and Chande recommends applying a three period moving average as a trigger line.

See Also

Forecast Oscillator Developer Help

17.37 Historical Volatility Indicator

Volatility is one of the most important factors when pricing options. When volatility is high, options premiums are relatively expensive; when volatility is low, options premiums are relatively cheap.

Volatility is a measure of the amount and speed of price changes, regardless of directions. "Historical Volatility is a measure of how volatile the underlying futures or options contracts have been for the specified number of trading days prior to each observation

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date in the data series. It is an annualized standard deviation of price changes expressed as a percentage.

See Also

Historical Volatility Developer Help

17.38 Intraday Momentum Index (IMI) Indicator

The Intraday Momentum Index (IMI) indicator is an average of a period's upward price changes to its downward price changes. Values above 70 indicate a potential price drop in the future while values below 30 indicate a potential rise.

See Also

Intraday Momentum Index (IMI) Developer Help

17.39 Keltner Band (Lower)

Keltner Bands, also known as Keltner Channels, were developed by Chester Keltner and introduced in his book "How To Make Money In Commodities". Keltner bands are similar to Bollinger Bands, however, instead of using band violations as a signal to counter trend, he intended the violation as a confirmation of a breakout to the upside or downside. A penetration of the lower band was considered a short signal and a penetration of the upper band is considered a long signal.

See Also

Keltner Band (Lower) Developer Help
Keltner (Upper)

17.40 Keltner Band (Upper)

Keltner Bands, also known as Keltner Channels, were developed by Chester Keltner and introduced in his book "How To Make Money In Commodities". Keltner bands are similar to Bollinger Bands, however, instead of using band violations as a signal to counter trend, he intended the violation as a confirmation of a breakout to the upside or downside. A penetration of the lower band was considered a short signal and a penetration of the upper band is considered a long signal.

See Also

Keltner Band (Upper) Developer Help
Keltner (Lower)

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17.41 Klinger Oscillator

A volume based indicator developed by Stephen J. Klinger. The indicator uses volume to attempt to measure the flow of money in or out of a security. To interpret the KO, look for divergence with the price to signal the coming end of a trend, or to indicate that rising/falling prices are not forming a new trend. A buy signal may be indicated when the oscillator value rises from below zero to cross above the trigger line. A sell signal may be indicated when the oscillator value falls from its high and crosses below the trigger line.

See Also

Klinger Oscillator Developer Help

17.42 Linear Regression Indicator

The Linear Regression Indicator plots the end-point of a Linear Regression Trendline for multiple Linear Regression Trendlines. This indicator shows where prices should be based on statistical analysis.

See Also

Linear Regression Developer Help
Linear Regression Slope
Linear Regression Trendline

17.43 Linear Regression Slope Indicator

The Linear Regression Slope function returns the slope component of a linear regression line of a field to time over a given number of periods. Linear Regression Slope is designed to show how much one should expect prices to change per unit of time.

See Also

Linear Regression Slope Developer Help
Linear Regression
Linear Regression Trendline

17.44 Linear Regression Trend Line Indicator

The linear regression trendline plots through past prices using the "least squares" method. The linear regression line can be used as a "mean reverting" indicator since the line is plotting the best path through the price action. Surges up or down from the trend line

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can be considered buy or short indicators in hopes that the price will revert to the mean.

See Also

Linear Regression Trend Line Developer Help
Linear Regression
Linear Regression Slope

17.45 MACD Indicator

There are two moving averages that make up MACD, the 12-day EMA is the faster and the 26-day EMA is the slower. Any price series can be used to form the moving averages, although the closing series is preferred. Usually, a 9-day EMA of MACD is plotted along side to act as a trigger line. A bullish crossover occurs when MACD moves above its 9-day EMA and a bearish crossover occurs when MACD moves below its 9-day EMA.

See Also

Moving Average Convergence/Divergence (MACD) Indicator Developer Help
Exponetial Moving Average (EMA) Indicator
Double Exponential Moving Average (DEMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator

17.46 Market Facilitation Index (MFI) Indicator

The Market Facilitation Index, created by Dr. Bill Williams, attempts to measure price movement in relation to volume. The MFI and volume figures are compared to establish four conditions. "Green" indicates a rise in volume over the previous period and a rise in MFI as well. "Fade" shows a decrease in volume and MFI compared to the previous bar. "Fake" indicators a drop in volume but a rise in MFI. "Squat" means that there has been an increase in volume, but a decrease in MFI.

On a green day, you would want to have an open position in the same direction as the trend. Fade may indicate a trendless market, but may also be a sign of a market where a trend may be emerging soon. Fake is a condition to avoid trading in. This may be a condition where no new outside money is being attracted at this time. Squat indicates a heavier volume and since MFI does not follow, this may be an indication of a trend reversal.

See Also

Market Facilitation Index (MFI) Developer Help

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17.47 Mass Index Indicator

The Mass Index, created by Donald Dorsey, attempts to identify price reversals by measuring the range between high and low prices over a given period. The well known signal to watch for with this indicator is the "reversal bulge". This occurs when the Mass Index (25 period) rises above 27 and falls back below 26.5. When the reversal bulge is spotted and the EMA points downward, open a long position. If the EMA points upward, open a short position.

See Also

Mass Index Developer Help

17.48 Median Price Indicator

Like the average price indicator, (high + low + close / 3), the median price attempts to the midpoint of the price action. The median price differs in that it only calculates the average between the high and low prices. Use this simple indicator to smooth the price action.

See Also

Median Price Developer Help
Average Price Indicator

17.49 Momentum Indicator

Simply put, this indicator measures the amount of change in price over the specified time period. Extreme momentum readings occur at the strongest point of the current trend. Overbought and oversold levels are set separately for each security, based on the performance of the indicator over past cycles. Use this indicator to determine when to go long or short. When the trend changes to bullish and the momentum indicator crosses above the zero line, it is time to consider a long position. The inverse is also true for either closing a long or opening a short position.

See Also

Momemtum Developer Help

17.50 Money Flow Index Indicator

The Money Flow Index is a momentum indicator similar to Relative Strength Index (RSI) except for the fact that it takes volume into consideration as opposed to just price action. A couple of signals can be derived from the MFI. If a divergence is occuring between the price and the Money Flow Index, a price reversal may be imminent. Like RSI,

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80 or better is considered overbought and 20 is considered oversold. Watch for tops or bottoms to occur within these ranges. This may be a sign that the trend is reversing.

See Also

Money Flow Index Developer Help

17.51 Multiply Series Indicator

A utility indicator to multiply two existing indicator series together.

See Also

Multiply Series Developer Help
Add Series
Subtract Series
Divide Series
Shift Series

17.52 Negative Volume Index (NVI) Indicator

The Negative Volume Index, by Norman Fosback, operates under the premise that "smart money" is in action on "quiet days" and will determine the move before the crowd steps in. Negative Volume Index crossing above its one year moving average may be the sign of a new bull market. The author claims that there is a 95% possibility of a bull market when the NVI is above its one year moving average.

See Also

Negative Volume Index (NVI) Developer Help
Positive Volume Index (PVI)

17.53 On Balance Volume Indicator

On Balance Volume (OBV) is an indicator developed by Joe Granville to represent the running total of volume. It shows whether or not volume is flowing in or out compared to the closing price. Volume is added to the indicator if closing price moves up and subtracted if closing price moves down. No adjustment is made if closing price is unchanged. A rising OBV may be indicative of an upward breakout, where conversely a falling OBV may be indicative of a downward breakout. On Balance Volume is best used as a confirmation indicator that is used in conjunction with other indicators.

See Also

On Balance Volume Developer Help

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17.54 Parabolic SAR Indicator

Developed by Welles Wilder, the Parabolic SAR (Stop And Reversal) is used to set trailing price stops. When the price rises above the SAR, you should close short positions. You should close long positions when the price falls below the SAR. You should also note that the current value of the SAR is today's stop level, not tomorrow's.

See Also

Parabolic SAR Developer Help

17.55 Performance Indicator

This indicator displays price movements as percentages. If the value of the indicator on bar X is 5, this means that the value of the asset has increased 5% since the first bar in the series. Conversely, a value of -5 would indicate a 5% drop in the asset price since the first bar in the series.

This percentage is useful for displaying differences in two or more assets over a period of time. This is a visual indicator that is not typically used to base trading decisions on.

See Also

Performance Developer Help

17.56 Positive Volume Index (PVI) Indicator

The Positive Volume Index, by Norman Fosback, operates under the premise that "smart money" is in action on "quiet days" and will determine the move before the crowd steps in. Positive Volume Index crossing above its one year moving average may be the sign of a new bull market. The author claims that there is a 76% possibility of a bull market when the PVI is above its one year moving average.

See Also

Positive Volume Index (PVI) Developer Help
Negative Volume Index (NVI)

17.57 Price and Volume Trend (PVT) Indicator

The Price and Volume Trend (PVT) indicator shows the balance between the supply and demand of a stock. This indicator is similar to the On Balance Volume indicator.

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See Also

Price and Volume Trend (PVT) Developer Help

17.58 Price Channel (Lower) Indicator

Price Channels, originally developed by Ralph Nelson Elliot, were originally used to signal the completion of wave counts that were central to his Elliott Wave Theory. Price channels are used to detect breakouts out of support or resistance lines. The upper channel is drawn at the highest high of last N periods. The lower channel is drawn at the lowest low of the last N periods. If the upper channel is penetrated, this may be a sign of new buyers and further appreciation of the asset. A penetration of the lower channel may be a sign of new selling and lower prices to come.

See Also

Price Channel (Lower) Developer Help
Price Channel (Upper)

17.59 Price Channel (Upper) Indicator

Price Channels, originally developed by Ralph Nelson Elliot, were originally used to signal the completion of wave counts that were central to his Elliott Wave Theory. Price channels are used to detect breakouts out of support or resistance lines. The upper channel is drawn at the highest high of last N periods. The lower channel is drawn at the lowest low of the last N periods. If the upper channel is penetrated, this may be a sign of new buyers and further appreciation of the asset. A penetration of the lower channel may be a sign of new selling and lower prices to come.

See Also

Price Channel (Upper) Developer Help
Price Channel (Lower)

17.60 Price Oscillator Indicator

This indicator displays the difference between two moving averages of the security's price. The first input is called the "short term" moving average and the second moving average is called "long term". When the short term moving average rises above the long term moving average, this may be a sign to buy. When the short term moving average crosses below the long term moving average, this may be an indicator to sell any holding, or open a short position.

See Also

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Price Oscillator Developer Help

17.61 Price Rate of Change Indicator

Like the Momentum Indicator, the Price Rate-of-Change (ROC) indicator measures the amount of change in price over the specified time period. This indicator displays the difference as a percentage. As the price increases, the rate-of-change will rise; as the price falls, the rate-of-change will fall.

See Also

Price Rate of Change Developer Help
Momentum Indicator

17.62 Qstick Indicator

The Qstick indicator was developed by Tushar S. Chande and Stanley Kroll and is described in their 1994 book The New Technical Trader. Qstick provides a way to quantify candlesticks. The Qstick indicator is a moving average of the difference between open and close prices. Qstick values below zero indicate a majority of black candlesticks (over the time periods specified) and therefore a bearish bias for the security. Values above zero indicate a majority of white candlesticks (over the time periods specified) and therefore a bullish bias for the security.

See Also

Qstick Developer Help

17.63 Range Indicator

The Range indicator, developed by Jack Weinberg, is based on the idea that average high to low prices versus average close to close prices may be a leading indication that a new trend is emerging or that an existing trend is about to end. Use the Range indicator as a confirmation indicator.

The range bound parameters are considered to be 20 and 80. If the range indicator reads 20 or below look for the possible emergence of a new trend. If the range indicator reads 80 or above, look for the signs of the existing trend to end.

See Also

Range Developer Help

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17.64 Relative Momentum Index (RMI) Indicator

The Relative Momentum Index (RMI) indicator is a variation of the Relative Strength Index (RSI) indicator. Like RSI, this indicator determines its values based on the upward and downward price changes. &nbps;The difference in the two being that RSI compares the current price to the price the day before, RMI compares the price to n days ago.

See Also

Relative Momentum Index (RMI) Developer Help
Relative Strength Index (RSI)

17.65 Relative Strength (RSI) Indicator

RSI was developed by J. Welles Wilder in 1978. It is an oscillating indicator where buy signals are readings of 30 and below while sell signals are of 70 or greater. In very volatile markets, 20 may be considered a buy and 80 a sell.

See Also

Relative Strength (RSI) Developer Help

17.66 Relative Vigor Index (RVI) Indicator

This is a trend following indicator that can confirm the general trend of the market. The idea behind Relative Vigor Index is that the vigor of the move is established when the prices end up at the close. To normalize the index to the daily trading range, divide the change of price by the maximum range of prices for the day. The calculation consists of dividing the close minus the open by the high minus the low. The number of periods specified is the "smoothing" factor. A default of 10 is recommended. As with most trend indicators, the higher number of periods, the less "whipsawing", but the worse the lag.

See Also

Relative Vigor Index (RVI) Developer Help

17.67 Relative Volatility Index Indicator

The Relative Volatility Index or RVI was developed by Donald Dorsey. RVI is simply an RSI with a standard deviation over the last n periods. The RVI is helpful in determining the direction of volatility. Use this in conjunction with momentum based indicators to confirm or deny the existence of a trend.

Readings above 60 combined with an upward price trend may indicate a buy signal. Readings below 40 with a downward price trend may indicate a sell or short sell situation.

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See Also

Relative Volatility Index Developer Help

17.68 rsquared indicator

rsquared is defined as a statistical measure of how well a regression line approximates real data points; an r-squared of 1.0 (100%) indicates a perfect fit. The closer rsquared is to one, the closer prices have fit to the linear regression line. rsquared is used for confirmation of a trend. Use this indicator in conjunction with momemtum indicators. If the momemtum indicator indicates that an item is in overbought or oversold territory, use rsquared to determine if the trend is in place, if not, a position contrary to the current condition may be warranted.

See Also

rsquared Developer Help

17.69 Shift Series Indicator

A utility indicator that will shift an existing series the specified number of positions to the left. The shift value can only be a negative number.

See Also

Shift Series Developer Help
Add Series
Subtract Series
Multiply Series
Shift Series

17.70 Simple Moving Average (SMA) Indicator

Moving averages are one of the oldest and most popular of technical analysis tools. A simple moving average is calculated by adding together the closing prices of a financial instrument over a certain number of days and then dividing the sum by the number of days involved. So, for example, the seven day average for a share price would be calculated by taking seven days worth of data, adding them together and dividing by seven.

There are many ways of interpreting moving averages. The most basic is to treat a change of direction in the moving average as a signal to buy or sell, so if the moving average has been consistently rising and then it falls, that is a signal to sell.

The classical interpretation, used by most technical analysts, is to compare the moving average with the price of the underlying asset and to plot them both on the same graph. Before the share price rises above its moving average, buy the share; when it falls below

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its moving average, sell the share. That is putting it in extremely simple terms, and for a more sophisticated understanding, read one of the many books on the subject.

A technical analyst would normally also consider other types of indicator before making a buy or sell decision.

See Also

SMA Crossovers
SMA Developer Help
Technical Indicator Overview
Technical Indicator List

17.71 Standard Deviation Indicator

Standard Deviation is the statistical measure of an assets volatility. Generally speaking, lower the StdDev reading, the lower volatility of said asset. One can speculate that markets tops or bottoms may be met with a significant up tick in volatility, where bases or ranges may have lower volatility readings.

See Also

Standard Deviation Developer Help
Standard Deviation Channel (Lower)
Standard Deviation Channel (Upper)

17.72 Standard Deviation Channel (Lower) Indicator

The Standard Deviation Channel consists of two lines that run parallel to the Linear Regression Trendline, one above and one below. The specified number of standard deviations is used to determine the distance of the lines from the trendline. A trend turn is expected if the prices stay outside the channel for a longer than usual.

See Also

Standard Deviation Channel (Lower) Developer Help
Standard Deviation
Standard Deviation Channel (Upper)
Linear Regression Trendline

17.73 Standard Deviation Channel (Upper) Indicator

The Standard Deviation Channel consists of two lines that run parallel to the Linear Regression Trendline, one above and one below. The specified number of standard deviations is used to determine the distance of the lines from the trendline. A trend turn

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is expected if the prices stay outside the channel for a longer than usual.

See Also

Standard Deviation Channel (Upper) Developer Help
Standard Deviation
Standard Deviation Channel (Lower)
Linear Regression Trendline

17.74 Standard Error Band (Lower) Indicator

The standard error bands, developed by Jon Anderson of Equis International, are a set of bands that attempt to show the trend and the volatility around the trend. Three plots are produced by this indicator. The middle plot is the ending value of an x-period linear regression line. The upper plot, the upper standard error band, is the result of adding two standard errors to the ending value of the regression line. The lower plot, the lower standard error band, is a result of subtracting two standard errors from the end value of the linear regression line. Jon Anderson notes the following:

Tight bands are an indication of a strong trend. Prices tend to bounce between the bands when the bands are wide. Tight bands followed by a widening of the bands may indicate the exhaustion of a trend and a possible reversal.

See Also

Standard Error Band (Lower) Developer Help
Standard Error Band (Upper)

17.75 Standard Error Band (Upper) Indicator

The standard error bands, developed by Jon Anderson of Equis International, are a set of bands that attempt to show the trend and the volatility around the trend. Three plots are produced by this indicator. The middle plot is the ending value of an x-period linear regression line. The upper plot, the upper standard error band, is the result of adding two standard errors to the ending value of the regression line. The lower plot, the lower standard error band, is a result of subtracting two standard errors from the end value of the linear regression line. Jon Anderson notes the following:

Tight bands are an indication of a strong trend. Prices tend to bounce between the bands when the bands are wide. Tight bands followed by a widening of the bands may indicate the exhaustion of a trend and a possible reversal.

See Also

Standard Error Band (Upper) Developer Help
Standard Error Band (Lower)

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17.76 Standard Error Indicator

Standard Error measures how closely prices congregate around a linear regression line. The closer prices are to the linear regression line, the higher the r-squared value and the stronger the trend. Typically, the larger the error the less reliable the trend as the price has greater variance around the Linear Regression line, prices are volatile. Conversely, the smaller the error, the more reliable the trend.

See Also

Standard Error Developer Help
Standard Error Channel (Lower)
Standard Error Channel (Upper)
Linear Regression Trendline

17.77 Standard Error Channel (Lower) Indicator

The Standard Error Channel indicator consists of two lines. These lines are based on the number of standard error calcuations above and below the Linear Regression Trendline. Use the channels to determine if the price has moved into "extreme" territories. Like most bands, extreme price movements mean that the price has penetrated the upper or lower band. If the price has moved outside of the bands, use other indicators to determine if a reversal is imminent.

See Also

Standard Error Channel (Lower) Developer Help
Standard Error
Standard Error Channel (Upper)
Linear Regression Trendline

17.78 Standard Error Channel (Upper) Indicator

The Standard Error Channel indicator consists of two lines. These lines are based on the number of standard error calcuations above and below the Linear Regression Trendline. Use the channels to determine if the price has moved into "extreme" territories. Like most bands, extreme price movements mean that the price has penetrated the upper or lower band. If the price has moved outside of the bands, use other indicators to determine if a reversal is imminent.

See Also

Standard Error Channel (Upper) Developer Help
Standard Error
Standard Error Channel (Lower)
Linear Regression Trendline

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17.79 Stochastic %D (Slow) Indicator

The "raw" stochastic calculation is referred to as %K. It is raw because it is calculated directly from the price and not smoothed. The raw value is very volatile, so it is typically smoothed (through a moving average). This smoothed value is called %D. A long signal occurs when the fast line crosses under the slow line below a reading of 20. A sell or short sell signal occurs when the fast line crosses over the slow line above a reading of 80.

See Also

Stochastic %D (Slow) Developer Help
Stochastic %K (Fast)
Stochastic Oscillator
Stochastic RSI

17.80 Stochastic %K (Fast) Indicator

The "raw" stochastic calculation is referred to as %K. It is raw because it is calculated directly from the price and not smoothed. The raw value is very volatile, so it is typically smoothed (through a moving average). This smoothed value is called %D. A long signal occurs when the fast line crosses under the slow line below a reading of 20. A sell or short sell signal occurs when the fast line crosses over the slow line above a reading of 80.

See Also

Stochastic %K (Fast) Developer Help
Stochastic %D (Slow)
Stochastic Oscillator
Stochastic RSI

17.81 Stochastic Momentum Index Indicator

The Stochastic Momentum Index (SMI) indicator, created by William Blau, is very similar to the Stochastic Oscillator indicator. This indicator calculates where the close is relative to the midpoint of the recent high/low range. If the close is greater than the midpoint, the indicator is above zero and vice versa.

See Also

Stochastic Momentum Index (SMI) Developer Help

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17.82 Stochastic Oscillator Indicator

The Stochastic Oscillator Technical Indicator compares where a security's price closed relative to its price range over a given time period. The "raw" value is referred to as %K. It is raw because it is calculated directly from the price and not smoothed. The raw value is very volatile, so it is typically smoothed (through a moving average). This smoothed value is called %D. A long signal occurs when the fast line crosses under the slow line below a reading of 20. A sell or short sell signal occurs when the fast line crosses over the slow line above a reading of 80.

See Also

Stochastic Oscillator Developer Help
Stochastic %K (Fast)
Stochastic %D (Slow)
Stochastic RSI

17.83 Stochastic RSI Indicator

Developed by Tuschar Chande and Stanley Kroll, StochRSI is an oscillator that measures the level of RSI relative to its range, over a set period of time. The indicator uses RSI as the foundation and applies to it the formula behind Stochastics. The result is an oscillator that fluctuates between 0 and 1. This oscillator provides a bit more sensitivity to the standard RSI.

See Also

StochRSI Developer Help
Stochastic %K (Fast)
Stochastic %D (Slow)
Stochastic Oscillator

17.84 Subtract Series Indicator

A utility indicator to subtracting two existing indicator series from one another.

See Also

Subtract Series Developer Help
Add Series
Multiply Series
Divide Series
Shift Series

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17.85 Swing Index Indicator

The Swing Index, by Welles Wilder, was developed to provide a line that decreases the noise that is price movements. The end result is a single line that represents true strength and direction of the market. The Swing Index is fairly volatile on its own, it is recommended that the Accumulated Swing Index be used for real signals.

See Also

Swing Index Developer Help
Accumulation Swing Index

17.86 Time Series Forecast Indicator

The Time Series Forecast indicator uses statistical analysis to predict a future value. This indicator is a composition of the Linear Regression Indicator and the Linear Regression Slope. Use this indicator to forecast the next periods price.

See Also

Time Series Forecast Developer Help
Linear Regression
Linear Regression Slope

17.87 Tirone Levels (Center) Indicator

Developed by John Tirone, the Tirone Levels Indicator consists of horizontal lines that help you recognize support and resistance levels based on a series of prices.

The center line is the calculation that the upper and lower levels use. It is calculated by taking the difference between the highest high and the lowest low for the asset price over a period of time and dividing it by 2.

See Also

Tirone Levels (Center) Developer Help
Tirone Levels (Upper)
Tirone Levels (Lower)

17.88 Tirone Levels (Lower) Indicator

Developed by John Tirone, the Tirone Levels Indicator consists of horizontal lines that help you recognize support and resistance levels based on a series of prices.

The lower level indicates support.

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See Also

Tirone Levels (Lower) Developer Help
Tirone Levels (Upper)
Tirone Levels (Center)

17.89 Tirone Levels (Upper) Indicator

Developed by John Tirone, the Tirone Levels Indicator consists of horizontal lines that help you recognize support and resistance levels based on a series of prices.

The upper level indicates resistance.

See Also

Tirone Levels (Upper) Developer Help
Tirone Levels (Lower)
Tirone Levels (Center)

17.90 Triangular Moving Average (TMA) Indicator

A triangular moving average is a form of a weighted moving average. Unlike an exponential moving average, the triangular moving average assigns a majority of the weight to the middle portion of the data.

See Also

Triangular Moving Average (TMA) Indicator Developer Help
Simple Moving Average (SMA) Indicator
Weighted Moving Average (WMA) Indicator
Exponential Moving Average (EMA) Indicator
Double Exponential Moving Average (DEMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator

17.91 TEMA Indicator

The Triple Exponential Moving Average was developed by Patrick Mulloy and published in the January 1994 of Technical Analysis of Stocks and Commodities. Moving averages are known for their lag time and the TEMA attempts to remedy this. The calculation consists of a single EMA and a double EMA to smooth out and produce less "head fakes". According to Mr. Mulloy, a TEMA smoothed MACD produces fewer, but more profitable signals as opposed to the traditional EMA smoothed MACD.

See Also

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Triple Exponential Moving Average (TEMA) Indicator Developer Help
Exponential Moving Average (EMA) Indicator
Double Exponential Moving Average (DEMA) Indicator
Moving Average Convergence/Divergence (MACD) Indicator

17.92 TRIX Indicator

TRIX was developed in the early 1980's by Jack Hutson, an editor for Technical Analysis of Stocks and Commodities magazine. This momentum indicator shows the rate-of-change of a triple exponentially smoothed moving average.

See Also

TRIX Developer Help

17.93 True Range Indicator

True Range is defined as the largest of the following:

1. The distance from today's high to today's low.
2. The distance from yesterday's close to today's high.
3. The distance from yesterday's close to today's low.

This indicator is a raw calculation used to calculate average true range (ATR).

See Also

True Range Developer Help
Average True Range Indicator

17.94 Ultimate Oscillator Indicator

Developed by Larry Williams to address the problems experienced with most oscillators when used over different lengths of time. The Ultimate Oscillator uses the weighted sums of three oscillators to represent short, intermediate and long term trends.

When the oscillator falls below 30, this is considered the oversold area and a reading of 70 or higher is considered the overbought area.

See Also

Ultimate Oscillator Developer Help

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17.95 Variable Moving Average (VMA) Indicator

The variable moving average is an exponential moving average that adjusts the smoothing percentage based on the volatility of the price data. The Variable Moving Average is used to account for volatility or lack thereof as the case may be. In times of low volatility, the moving average time period will be shorter to be more sensitive for when the trend breaks. In more volatile times, the moving average time period will be longer which ideally will filter out the choppiness.

The Variable Moving Average is also known as the VIDYA Indicator.

See Also

Variable Moving Average (VMA) Indicator Developer Help
Simple Moving Average (SMA) Indicator
Triangular Moving Average (TMA) Indicator
Exponential Moving Average (EMA) Indicator
Double Exponential Moving Average (DEMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator

17.96 Vertical Horizontal Filter (VHF) Indicator

The Vertical Horizontal Filter (VHF) was devloped by Adam White to help determine if the current market is in a trending phase or a congestion phase. There are three different ways of interpreting the VHF:

A high VHF means that the degree of trending is high and Trend Indicators will be more accurate. Rising and falling VHF values indicate that a trending or congestion phase is developing, respectively. And, the start of a trend will be preceded by low values and its end preceded by high values.

See Also

Vertical Horizontal Filter (VHF) Developer Help

17.97 Volume Adjusted Moving Average Indicator

The volume adjusted moving average indicator, by Dick Arms, assigns the majority of the weight to the days with the most volume.

See Also

Volume Adjusted Moving Average Indicator Developer Help
Simple Moving Average (SMA) Indicator
Triangular Moving Average (TMA) Indicator
Exponential Moving Average (EMA) Indicator
Double Exponential Moving Average (DEMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator

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17.98 Volume Oscillator Indicator

The volume oscillator measures the difference between a specified long and short moving average. A rising volume with rising prices signals a growing trend.

See Also

Volume Oscillator Developer Help

17.99 Volume Rate of Change Indicator

The volume rate of change is the indicator that shows whether or not a volume trend is developing in either an up or down direction. Most analysts use this indicator in conjunction with a price indicator. A spike in the volume rate of change may confirm a price indicator signal.

See Also

Volume Rate of Change Developer Help

17.100 Weighted Close Indicator

Like the average price indicator, (high + low + close / 3), the weighted close attempts to show the midpoint of the price action. The weighted close differs in that it puts more emphasis on the closing price.

See Also

Weighted Close Developer Help
Average Price Indicator

17.101 Weighted Moving Average (WMA) Indicator

A weighted moving average assigns greater weight to the most recent data. The weighting is calculated from the sum of periods. For example, take a 10 period moving average. For an SMA, the weighting of the current bar would be 10% (1 / 10). For an EMA, the weight of the current bar would be about 18.18% (2 / [10 + 1]). For a weighted moving average, the weight of the current bar would be about 18.2% (10 / [(10 * 11) / 2]).

See Also

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Weighted Moving Average (WMA) Indicator Developer Help
Simple Moving Average (SMA) Indicator
Triangular Moving Average (WMA) Indicator
Exponential Moving Average (EMA) Indicator
Double Exponential Moving Average (DEMA) Indicator
Triple Exponential Moving Average (TEMA) Indicator

17.102 Widner Band (Lower) Indicator

These projection bands were developed by Mel Widner, Ph.D. They were originally introduced in the July 1995 issue of Technical Analysis of Stocks and Commodities magazine. This band set is used as most others (i.e. Bollinger bands) whereby the plotted prices give a clue as to whether the current price is relatively low or high. Prices plotted at the lower end of the band or prices that penetrate the lower band may indicate overly pessimistic prices and a correction or reversion to mean may be in order. The inverse is true if prices are plotted on the upper end of the band.

See Also

Widner Band (Lower) Developer Help
Widner Band (Upper)
Widner Oscillator

17.103 Widner Band (Upper) Indicator

These projection bands were developed by Mel Widner, Ph.D. They were originally introduced in the July 1995 issue of Technical Analysis of Stocks and Commodities magazine. This band set is used as most others (i.e. Bollinger bands) whereby the plotted prices give a clue as to whether the current price is relatively low or high. Prices plotted at the lower end of the band or prices that penetrate the lower band may indicate overly pessimistic prices and a correction or reversion to mean may be in order. The inverse is true if prices are plotted on the upper end of the band.

See Also

Widner Band (Upper) Developer Help
Widner Band (Lower)
Widner Oscillator

17.104 Widner Oscillator Indicator

These projection bands were developed by Mel Widner, Ph.D. They were originally introduced in the July 1995 issue of Technical Analysis of Stocks and Commodities magazine. This band set is used as most others (i.e. Bollinger bands) whereby the plotted prices give a clue as to whether the current price is relatively low or high. Prices plotted at the lower end of the band or prices that penetrate the lower band may indicate overly

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pessimistic prices and a correction or reversion to mean may be in order. The inverse is true if prices are plotted on the upper end of the band.

See Also

Widner Oscillator Developer Help
Widner Band (Lower)
Widner Band (Upper)

17.105 Wilders Smoothing Indicator

Created by Welles Wilder, the Wilder's Smoothing indicator is similar to the Exponential Moving Average. It responds slowly to price changes compared to other moving averages. Wilder's Smoothing is used as a part of RSI.

See Also

Wilders Smoothing Developer Help
Exponential Moving Average (EMA)
Relative Strength Index (RSI)

17.106 Williams %R Indicator

This indicator was developed by Larry Williams to identify overbought and oversold conditions. Williams %R is similar to other oscillators, particularly the stochastic oscillator, except for the fact that it oscillates in a negative range. Readings between -80 and -100 indicate that the item may be oversold and to watch for a potential reversal. Readings between 0 and -20 indicate that the item may be overbought and that it might be a good time to watch for a selling point.

See Also

Williams %R Developer Help

17.107 Williams Accumulation / Distribution Indicator

This indicator is similar in nature to Accumulation/Distribution except for the fact that it's based on true range values instead of simply OHLC. Also, the traditional Accumulation/ Distribution factors volume into the calculation, where the Williams's version does not. Williams recommends paying attention to this indicator in the following situations:

When there is a bullish divergence between the indicator and the price of the asset, this may be interpreted as a signal to go long. If there is a bearish divergence between the indicator and the price of the asset, this may be interpreted as a signal to go short.

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See Also

Williams Accumulation / Distribution Developer Help
Accumulation / Distribution

17.108 Zig Zag Indicator

Zig Zag connects price fluctuations on a chart. Based on the minimum percentage change, straight lines will be drawn connecting these points on the chart when the price moves the specified percentage. A point is not plotted until the minimum percentage change is reached.

The Zig Zag indicator is typically used to identify potential Elliot Wave formations.

See Also

ZigZag Developer Help

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18 Risk Evaluators

18.1 Payoff Ratio

The payoff ratio is simply the system's average profit per trade divided by the average loss per trade. The higher the payoff ratio, the better the system.

See Also

Sharpe Ratio
Profit Factor
Recovery Factor
Risk Adjusted Return
Risk Assessment Options

18.2 Profit Factor

The profit factor is the system's gross profit divided by the gross loss. This calculation indicates how many dollars are won for every dollar lost. Profit factors of around 2.0 are ideal. High readings on the profit factor (for example, readings above 3.0) might be over optimized.

See Also

Sharpe Ratio
Payoff Ratio
Recovery Factor
Risk Adjusted Return
Risk Assessment Options

18.3 Recovery Factor

This value helps gauge how a system recovers from drawdowns. The recovery factor is calculated by taking the system's absolute value of net profit and dividing it by the maximum drawdown. This value should exceed the value of the Buy & Hold Recovery Factor.

See Also

Sharpe Ratio
Payoff Ratio
Profit Factor
Risk Adjusted Return
Risk Assessment Options

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18.4 Risk Adjusted Return

This value measures the amount of risk taken on in relation to the amount returned. Also known as the "return per risk unit". The calculation takes the system's annual percentage return (APR) and divides it by the average exposure percentage.

See Also

Sharpe Ratio
Payoff Ratio
Profit Factor
Recovery Factor
Risk Assessment Options

18.5 Sharpe Ratio

The Sharpe Ratio, developed by William F. Sharpe, is used to measure risk/reward efficiency within a portfolio or trading strategy. The calculation uses the standard deviation of returns to determine how "risky" a portfolio is. The higher the Sharpe Ratio value, the better the risk for return the portfolio is. A Sharpe ratio value around or greater than 2 is considered excellent. It is generally advised that anything below 1 should not be considered.

See Also

Payoff Ratio
Profit Factor
Recovery Factor
Risk Adjusted Return
Risk Assessment Options

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19 Glossary of Terms

19.1 Futures

An established contract that gives the person the obligation to buy or sell a certain amount of a commodity or index at a certain date.

19.2 Asset Class

The name of an asset category. Assets classes include stocks, bonds, cash, real estate, etc.

19.3 Strike Price

Sometimes refered to as the "striking price" or "exercise price", it is the specified price on an option contract at which the contract may be exercised.

19.4 Forex

An acronym for Foreign Exchange market. This over-the-counter market is where currencies are traded.

19.5 Exchange

The company or organization that provides the market for stocks, options, futures and currencies.

19.6 APR

The increase or decrease of an investment over the time span of one year represented as a percentage.

19.7 Backtesting

A systematic or mechanical approach aimed at testing a trading strategy against historical data. The tester creates a hypothetical portfolio and applies technical indicators against this hypothetical portfolio. Positions are opened and closed based on the system rules and profit and loss is accounted for.

Backtesting is used to quickly determine if a trading idea is viable where if the same idea was applied in real time, it could potentially take years to answer the same question. **However, it is very important to note that backtesting results are no indication of future performance.**

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See Also

Trading System Overview
New Trading System
Trading System Pane

19.8 Buy & Hold

Buy and hold is an investment strategy where an underlying asset is purchased and held with strong speculation that the underlying asset will perform exceptionally well over the long term regardless of short term volatility. This is a popular strategy given the fact that the U.S. stock market, namely the S&P 500 index has returned around 11-13% over the last 50 years excluding dividends. Buying and holding also minimizes trading costs such as commissions and taxation.

Long
Short Selling

19.9 C#

Pronounced "See Sharp" is an object-oriented programming language created by Microsoft and first introduced as part of their .NET initiative. C# is a widely supported language which has syntax and structure that is very similar to Java and C++.

C# is a modern, general purpose language that is very well suited for developing very complex systems all the way down to small functions.

RightEdge currently supports the 2.0 version of the C# language as distributed in the Microsoft.NET Framework v2.0. As a result, RightEdge has support for advanced language features introduced in v2.0 such as generics, anonymous methods and partial classes.

For more information about the 2.0 version of the C# language, visit The C# Language.

See Also

Visual Basic.NET
New Trading System
Trading System Pane

19.10 Drawdown

Drawdown is the amount of capital that you could've lost at any given point.

Example: If a position is opened for $2,000, the market moves sharply lower and at the end of the day the $2,000 position is now worth $1,000. This has given the system a drawdown of 50%. When analyzing the results of a system, pay attention to drawdown.

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If drawdown is 90%, but exposure is 1%, that is reasonably tolerable. If your exposure is 90% and your drawdown is 30-40%, that's a sign that the system has the potential to be down a lot of money at any given point.

See Also

Analyzing System Results
MFE
MAE
Exposure

19.11 Exposure

Exposure is the amount of your capital exposed to the market. For example, if you have $10,000 and you open a position for $2,000, you are at 20% exposure. If you open another position for $4,000, your exposure is 40%.

See Also

Analyzing System Results
MFE
MAE
Drawdown

19.12 Initial Margin

Typically used for futures contracts, this is the percentage of the overall contract value that must be paid from the investor's own funds.

19.13 Limit Order

An order submitted to a broker to buy or sell a security or contract at a specific price. There are typically two types of limit orders, limit orders that are good for the life of the trading and then cancelled and there are also limits orders that are good until they are cancelled (known as GTC) by the person submitting the order.

19.14 Long Position

Taking a long position, or going long involves buying or obtaining an actual position in an underlying asset. This is the opposite of holding a short position or being short.

See Also

Short Selling
Buy and Hold

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19.15 MAE

MAE is the abbreviation for maximum adverse excursion. Made famous by John Sweeney, the MAE for each trade is defined as the lowest low of the open profit within the trade. If a long trade went down to a penny a share, the MAE percentage would be 99%. Conversely, if the long trade never went below the purchase price, the MAE would be 0. This calculation can be used in conjunction with drawdown to help determine how much the trade or strategy goes against before it goes for.

See Also

Analyzing System Results
MFE
Drawdown

19.16 Maintenance Margin

The minimum amount of equity allowed in a margin account. This is usually less than the initial margin.

19.17 Margin

Funds available on loan from a broker to purchase securities, options or futures contracts.

19.18 MFE

MFE is the abbreviation for maximum favorable excursion. Made famous by John Sweeney, the MFE for each trade is defined as the highest high of the open profit within the trade. If a long trade was established at $50 and closed at $60, but the stock had gone up to $100, the MFE is 100%.

See Also

Analyzing System Results
MAE
Drawdown

19.19 OHLC Charts - Definition

This is an abbreviated name for "Open, High, Low, Close" chart. This is a chart style where each price point mentioned is noted.

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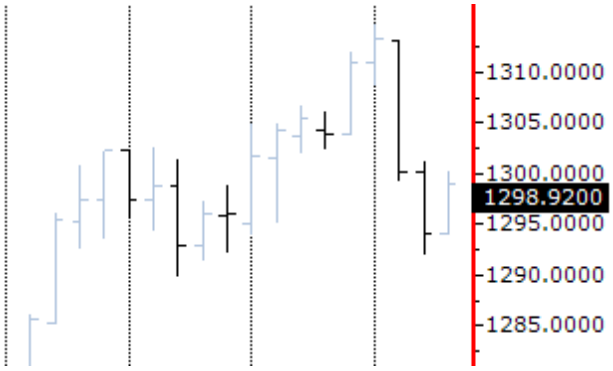

The chart above points out some of the basic features of the OHLC charts.

The "up" days (where the close is higher than the open) is the lighter of the two lines and the "down" days are represented with darker lines. The high for the day is the highest point of the line, where the low price of the day is the lowest point of the line. The opening price is represented by the horizontal tick that faces to the left and the closing price is represented by the horizontal tick that faces to the right.

See Also

Candlestick Charts
Candlestick Chart Patterns
Line Charts
Bar Charts

19.20 Option

The right, but not the obligation, to buy or short sell a specific amount of a given stock, commodity, currency, or index, at a specified price during a specified period of time. The buyer of a call option has the right to buy shares of the underlying asset at the specified price and the buyer of a put option has the right to short sell the shares of the underlying asset at the specified price.

19.21 Profit Target

Profit targets are orders that are placed after a position is opened. This is typically set as a percentage of the opening price. For example, if 100 shares of stock XYZ was purchased at 50, if a profit target of 10% is set in the trading system, an order is sent to close the position when the price of XYZ reaches 55. To set a profit target within a trading system, review the Setting a Profit Target topic.

See Also

Analyzing System Results
Setting a Profit Target

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19.22 Short Selling

Short selling, selling short or "shorting" is a way to profit from the falling price of the underlying asset. This is accomplished by selling, or borrowing shares or contracts of an asset that is not currently owned. Since the asset is sold, an account will be credited with the current selling price. However, the short seller must return the borrowed asset at a later date. This is known as covering the short position.

For the short seller to profit, ideally the short position is covered when the price of the underlying asset is at a price that is less than what it was sold for. The short seller can buy the asset back, thereby becoming flat and pocket the difference.

Short selling is considered risky by most for two reasons. First, it is possible to lose more than 100% of your account short selling. Since it is not possible for an asset price to go below 0, the long position taker cannot lose more than 100% of the initial investment. However, it is possible for any asset to more than double, therefore, making it possible for a short seller to lose more than 100% of the initial investment.

The second problem is that since an asset is borrowed from the broker, the broker typically charges interest on the borrowed asset. Not only will the position have to move in the right direction, but it will have to move faster than the interest rate charged by the broker to be profitable.

19.23 Stock

A certificate that represents ownership in a corporation.

19.24 Stop Loss

Stop loss orders are orders that are placed after a position is opened. This is typically set as a percentage of the opening price. For example, if 100 shares of stock XYZ was purchased at 50, if a stop loss of 10% is set in the trading system, an order is sent to close the position when the price of XYZ reaches 45. To set a stop loss within a trading system, review the Setting a Stop Loss topic.

See Also

Analyzing System Results
Setting a Stop Loss

19.25 Symbols

A symbol is a representation of a complete and fully identifiable trading item. A complete symbol for a stock is simply its ticker symbol. A complete symbol for a futures contract consists of a root symbol (i.e. ES) and an expiration date. While an option symbol would consist of a root symbol, strike price, contract type (put or call) and expiration date.

Symbols are grouped into Watchlists. These groupings can be used to collect live data,

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backtest as a complete portfolio or run live systems.

See Also

Setup a Watchlist

19.26 Timeout

Timeout orders are unique in that they are not actually submitted to the broker. They are handled internally by RightEdge.

When a timeout value is set, RightEdge keeps track of the number of bars that the position has been open. Once the number of bars specified has been reached, RightEdge will submit a market order to close the position at the open of the next bar.

Note: The order is submitted to close any open position when the timeout is hit regardless of if the position is profitable or not.

See Also

Analyzing System Results
Setting a Timeout

19.27 Visual Basic.NET

Visual Basic.NET is the next generation of the popular Visual Basic compiler by Microsoft. Visual Basic.NET is designed to extend the ease of development provided Visual Basic into the .NET Framework. While the syntax in Visual Basic.NET is very similar to that of the classic Visual Basic, these languages are not compatible.

RightEdge supports the latest released version of Visual Basic, commonly referred to as Visual Basic 2005. As a result, RightEdge supports new language features such as XML comment to produce automatic documentation, partial classes, nullable types, generics and partial classes.

For general information about Visual Basic 2005, visit the Visual Basic Developer Center at Microsoft.

See Also

C#
New Trading System
Trading System Pane

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